



DEPARTMENT OF ECOLOGY

MAY 15 2009

WATER QUALITY PROGRAM

State of Washington

DEPARTMENT OF FISH AND WILDLIFE

Mailing Address: 600 Capitol Way N Olympia, WA 98501-1091 (360) 902-2222, TDD (360) 902-2207

Main Office Location: Natural Resources Building 1111 Washington Street SE Olympia, WA

May 15, 2009

Jonathan Jennings
Aquatic Pesticide Program
Department of Ecology
P.O. Box 47600
Olympia, Washington 98504-7600

NPDES Permit WA0041009
Annual Report

Dear Mr. Jennings:

Enclosed are Washington Department of Fish and Wildlife's Post-Treatment Discharge Monitoring Reports for Byron Ponds (Yakima County) treated with rotenone in March 2008; Cee-Cee-Ah Creek (Pend Oreille County); the North Potholes-Northern Leopard Frog enhancement project and North Potholes-Westlake Ponds Desert Lakes TD2 project (Grant County); Frater Lake (Pend Oreille County); Ellen Lake (Ferry County); Hatch, Little Hatch and Williams lakes (Stevens County) treated with rotenone in the fall of 2008. All other pertinent documentation as mandated by the reporting requirement under S3.A of NPDES Waste Discharge Individual Permit Number WA0041009 is included.

The treatment of Worth Lake (Franklin County), initially identified for treatment in the fall of 2008, was deferred until a later time due to logistical constraints. The treatments of several lakes in Grant County; the Canal chain-of-lakes (Heart, June, Windmill, North Windmill, North North Windmill, and Canal Lakes), and the Desert Wildlife Area chain-of-lakes (Beda Lake, Brookies Lake, Aztec Lake, Desert Lake, North Desert Lake, Dune Lake, Harris Lake, Lizard Lake, Meadowlark Lake, Sedge Lake, Tern Lake), in Franklin County (Powerline Lake), and in Okanogan County (Franchers Dam Pond) were deferred from consideration until 2009, due to logistical and staffing concerns. Likewise, alternate waters identified in Grant County (Lenice, Merry and Nunnally Lakes, and the Caliche lakes) were not treated.

Keogh Lake in Stevens County was not treated, as this water body was not connected to Hatch Lake and rehabilitation was unnecessary to achieve management goals. West Medical and Fish lakes in Spokane County were identified as candidates for treatment, but game fish survival and angling success were sufficiently robust in 2008 that these waters were dropped from final consideration. Big Buck Lake in Okanogan County suffered winter kill during the winter of 2007-08, and treatment with rotenone was unnecessary in 2008.

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WASHINGTON STATE DEPARTMENT OF FISH & WILDLIFE

Also enclosed is a copy of the amended FSEIS for the lakes proposed for treatment in the fall of 2008 and spring of 2009, including all SEPA comments, results and decisions, as well as the 2008-2009 Lake and Stream Rehabilitation Proposal list.

Please feel free to contact me at 360-902-2711 or email anderjda@dfw.wa.gov with any questions.

Sincerely,



Jon. Anderson
Resident Native Fisheries Manager

Enclosures

cc: Jim Uehara, WDFW Olympia

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

POST-TREATMENT DISCHARGE MONITORING REPORTS

DEPARTMENT OF ECOLOGY

MAY 15 2000

WATER QUALITY PROGRAM

YAKIMA COUNTY

BYRON PONDS

PEND OREILLE COUNTY

CEE-CEE-AH CREEK

GRANT COUNTY

NORTH POTHoles – NORTHERN LEOPARD FROG PROJECT

NORTH POTHoles – DESERT LAKES TD2 PONDS

PEND OREILLE COUNTY

FRATER LAKE

FERRY COUNTY

ELLEN LAKE

STEVENS COUNTY

HATCH LAKE

LITTLE HATCH LAKE

WILLIAMS LAKE

OKANOGAN COUNTY

STARZMAN LAKES

RECEIVED BY THE SECRETARY

OFFICE OF THE SECRETARY

DEPARTMENT OF THE INTERIOR

POST-REHABILITATION REPORT

Byron Ponds

WATER: Byron Ponds Management Unit, Sunnyside Wildlife Area

LOCATION: Yakima Co.; Sections 10, 11, & 12, T8N, R23E, consisting of the inlet canal west of Bus Road, all the way to the new control structure near the eastern portion of the management unit.

DATE(S) TREATED: March 5-6, 2008

PURPOSE: Improve waterfowl nesting and rearing success through the reduction in numbers of undesirable species of fish, primarily carp, to the extent possible.

LICENSED APPLICATOR: Jeffrey W Korth, WA Dept Fish and Wildlife (DFW), District 5 Fisheries Biologist, Pesticide License # 39429.

LAKE DESCRIPTION @ time of treatment; water level approximately 1-2 ft below high water:

Surface acres: 84

Depth: average 0.5-1.5; maximum 5 ft

Volume: 81 acre-feet

Weight of Water: 220,169,664 lbs

Connectivity: A lift pump on adjacent private land pumps groundwater into the system 24/7, year around. A small amount of irrigation tailwater from rill-irrigated fields enters the drainage after being filtered through substantial vegetation. The outlet has a water control structure at which outflow can be stopped. Released outflow enters a drainage ditch with 0.5 to 0.8 cfs flow (May/June 2007) for about 3 miles before falling over a basalt cliff and entering the Yakima River.

TREATMENT DESCRIPTION:

Toxicant used: Rotenone - Liquid CFT Legumine EPA Reg # 75338-2; 5% equivalent ; 108 gal.

Total Concentration Applied: 4 ppm

Rotenone concentrations achieved during the treatment were calculated without regard to daily rates of degradation or dilution. Precise rates of detoxification on a daily basis were not known. Only enough rotenone was used during the entire treatment to achieve the desired concentrations given an instantaneous treatment (4 ppm product, 0.20 ppm actual rotenone for all lakes). Actual concentrations in the lakes would have been somewhat less since rotenone began degrading on the first day of treatment and inflow provided constant dilution.

Methods: All liquid sprayed by helicopter, ATV, by hand using a spray tank, and small boat.

Detoxification Procedures: treated waters naturally detoxified. No outflow detoxification was necessary; all outflow from system was contained.

PHYSICAL CHARACTERISTICS OF THE LAKE DURING TREATMENT:

Weather - Sunny, 5 mph W/SW wind, air temp = 40's °F.

Pre-treatment water quality parameters –

Depth (m)	Water Temp (°C)	Dissolved Oxygen (mg/l)	pH
Surface	2.33	10.4	8.11

SPECIES ERADICATED IN ORDER OF RELATIVE ABUNDANCE:

- 1) Carp (thousands, mostly 6 to 12 inches, with a only a few at 24 inches);
- 2) Pumpkinseed (thousands, primarily 1-3 inches);
- 3) Bullheads (less than a hundred spotted, primarily 2-4").

PRE- AND POST- TREATMENT MONITORING (all monitoring conducted as outlined in DFW's NPDES permit WA0041009:

Impact to non-targeted organisms – Zooplankton were sampled at Byron Ponds for diversity and abundance just previous to treatment, and will again be sampled six months and 12 months post treatment. Samples are currently being processed, and the results will be available by separate report.

Liquid rotenone formulation longevity – Water samples were taken at Byron Ponds 24 hours and four weeks post treatment to check for residues related to the carriers present in the liquid formulation of rotenone. Water samples were taken in areas of the lake where the heaviest concentrations of liquid rotenone were applied or might accumulate. Samples were sent to an accredited lab for analyses per EPA methods. Samples were analyzed for 64 volatile and semi-volatile organic compounds, including benzene, toluene, phenol, xylene, and derivatives of these compounds, and detection limits were 0.02-3.0 ug/l, variously. In both the 24 hr and the 4-week sample, the amounts of all 64 compounds possibly present in liquid rotenone formulations were below detection limits.

Period of Toxicity – Persistent rotenone toxicity was determined by bioassay. Live trout were held in a live-box (5 gal volume with free flow-through) in the water monitored. Trout exhibit signs of stress and loose equilibrium after three hours at rotenone concentrations of 0.05 ppm product (0.0025 ppm actual rotenone) at water temperatures of 47° F, and response is fairly uniform among individuals in similar circumstances. Rotenone is considered below detection limits when trout remain alive for at least 48 hours. Individual mortalities within a group of trout frequently occur due to mechanical damage when handled or transported/confined in relatively small containers.

Bioassay began 12 days post-treatment in two locations. Eight rainbow were placed in a live-box at the inlet and 15 rainbow were placed at the outlet of Byron Ponds. No sign of distress was observed after 30 minutes in the water. After 48 hours in the water, two of the eight trout at the inlet had perished and one of the 15 trout at the outlet had perished. Rotenone toxicity was determined to be below detection limits, and the three trout mortalities were determined to be due to other factors (mechanical damage during transport or captivity).

DESCRIPTION OF TREATMENT AND OTHER COMMENTS:

The spring 2008 treatment of the Byron Ponds was accomplished entirely with liquid rotenone. A new water control structure was installed to replace the original one built in the 1940's. Prior to treatment, the entire unit was drained as low as possible to minimize water volume. Dense areas of emergent vegetation were burned to expose any standing water for more thorough contact by rotenone. Much of the area, which is typically inundated, was dry and all remaining water was very shallow. A helicopter was used to spray 90 gallons over all open water on the first day of treatment, including the ponds to the north. Another 18 gallons were applied by other means from ground level. An ATV was used to treat the incoming canal after the helicopter application. A backpack sprayer was used to treat a small amount of water from a natural spring, although that water was currently blocked from the main treatment area by a beaver dam. On the second day, an ATV spray tank, mounted in a small boat, was used to treat a small lobe of the main pond area that we suspected might have been missed by the helicopter. By the third day, no live fish were observed.

Cost: About 13 man-days (man-day = 8 hrs) were required to complete the treatment of Byron Ponds from pre-treatment preparation (signing, sampling, rotenone and equipment transport) through treatment, clean up, and travel. Total cost of the treatment alone (rotenone, labor - \$268/day, travel, expendable equipment) was approximately \$15,000, including about \$2,400 for labor during the treatment, \$8,316 for rotenone (liquid @ \$77/gal), and \$3,231 for the helicopter application. Estimated time for pre-rehabilitation proposals, general public outreach, post-rehabilitation sampling and reports added about 6 days.

Restocking the area with bass and bluegill is planned, but has not yet occurred.

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S80312.3
Client: Washington Department of Fish and Wildlife
Client Job Name: Byron Ponds
Client Job Number:

Analytical Results

8260, µg/L	MTH BLK		LCS Byron Ponds		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			03/07/08			
Date analyzed	Limits	03/13/08	03/13/08	03/13/08	03/13/08	03/13/08	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
Acetone	10.0	nd		nd			
1,1-Dichloroethene	1.0	nd	108%	nd	110%	108%	2%
Methylene chloride	10.0	nd		nd			
Methyl-t-butyl ether (MTBE)	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
n-Hexane	1.0	nd		nd			
2-Butanone (MEK)	10.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	106%	nd	107%	107%	0%
Trichloroethene (TCE)	1.0	nd	107%	nd	107%	106%	1%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	106%	nd	109%	109%	0%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
2-Hexanone	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene (PCE)	1.0	nd		nd			
1,2-Dibromoethane (EDB)	0.10	nd		nd			
Chlorobenzene	1.0	nd	111%	nd	114%	111%	3%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	1.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

*-Instrument detection limits

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Client Job Number:

Analytical Results

8260, µg/L	MTH BLK		LCS Byron Ponds		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			03/07/08			
Date analyzed	Limits	03/13/08	03/13/08	03/13/08	03/13/08	03/13/08	

Surrogate recoveries:

Dibromofluoromethane	131%	127%	134%	125%	127%
Toluene-d8	103%	103%	104%	103%	103%
4-Bromofluorobenzene	96%	96%	94%	96%	97%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

J - estimated quantitation, below listed reporting limits

Acceptable Recovery limits: 65% TO 135%

Acceptable RPD limit: 35%

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Client Job Number:

Analytical Results

8270, µg/L	MTH BLK		LCS Byron Ponds		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	03/12/08	03/12/08	03/12/08	03/12/08	03/12/08	
Date analyzed	Limits	03/12/08	03/12/08	03/12/08	03/12/08	03/12/08	
Sample collected				03/07/08			
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	88%	92%	4%
2-Chlorophenol	2.0	nd		nd	107%	100%	7%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	118%	nd	103%	102%	1%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexachloroethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	111%	111%	0%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd			
2,4-Dimethylphenol	2.0	nd		nd	97%	98%	1%
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	120%	118%	2%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	109%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	76%	80%	5%
2-Methylnaphthalene	2.0	nd		nd			
1-Methylnaphthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinitrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	109%	nd	97%	96%	1%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd	86%	86%	0%
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	106%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd	67%	70%	4%
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	117%	nd			
Pyrene	0.2	nd		nd	94%	97%	3%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	87%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	120%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

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Client Job Name: Byron Ponds
Client Job Number:

Analytical Results

8270, µg/L	MTH BLK		LCS Byron Ponds		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	03/12/08	03/12/08	03/12/08	03/12/08	03/12/08	
Date analyzed	Limits	03/12/08	03/12/08	03/12/08	03/12/08	03/12/08	
Sample collected				03/07/08			

Surrogate recoveries

2-Fluorophenol	96%		117%	99%	98%
Phenol-d6	94%		125%	91%	91%
Nitrobenzene-d5	119%	97%	86%	86%	85%
2-Fluorobiphenyl	92%	106%	87%	88%	83%
2,4,6-Tribromophenol	89%		105%	95%	98%
4-Terphenyl-d14	98%	108%	88%	88%	86%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %

Phenol - d5: 10-135 %

2,4,6-tribromophenol: 29-159%

Nitrobenzene - d5: 20-120 %

2-Fluorobiphenyl: 50-150%

p-Terphenyl-d14: 50-150%

Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
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Client: Washington Department of Fish and Wildlife
Client Job Name: Byron Ponds

Analytical Results

8260, µg/L	MTH BLK		LCS Byron Ponds		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			04/01/08			
Date analyzed	Limits	04/04/08	04/04/08	04/04/08	04/04/08	04/04/08	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
Acetone	10.0	nd		nd			
1,1-Dichloroethene	1.0	nd	96%	nd	91%	95%	4%
Methylene chloride	10.0	nd		nd			
Methyl-t-butyl ether (MTBE)	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
n-Hexane	1.0	nd		nd			
2-Butanone (MEK)	10.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	104%	nd	104%	98%	6%
Trichloroethene (TCE)	1.0	nd	103%	nd	104%	99%	5%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	116%	nd	116%	105%	10%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
2-Hexanone	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene (PCE)	1.0	nd		nd			
1,2-Dibromoethane (EDB)	0.10	nd		nd			
Chlorobenzene	1.0	nd	122%	nd	120%	111%	8%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	1.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

*-instrument detection limits

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

Client: Washington Department of Fish and Wildlife
Client Job Name: Byron Ponds

Analytical Results

8260, µg/L	MTH BLK		LCS Byron Ponds		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Sample Collected	Reporting			04/01/08			
Date analyzed	Limits	04/04/08	04/04/08	04/04/08	04/04/08	04/04/08	

Surrogate recoveries:

Dibromofluoromethane	133%	126%	128%	125%	126%
Toluene-d8	108%	106%	101%	106%	104%
4-Bromofluorobenzene	96%	96%	98%	92%	95%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

J - estimated quantitation, below listed reporting limits

Acceptable Recovery limits: 65% TO 135%

Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

Client: Washington Department of Fish and Wildlife
Client Job Name: Byron Ponds

Analytical Results

8270, µg/L	MTH BLK		LCS Byron Ponds		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	04/09/08	04/09/08	04/07/08	04/09/08	04/09/08	
Date analyzed	Limits	04/09/08	04/09/08	04/09/08	04/09/08	04/09/08	
Sample collected	04/01/08						
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	84%	90%	7%
2-Chlorophenol	2.0	nd		nd	107%	111%	4%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	112%	nd	102%	100%	2%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexachloroethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	110%	110%	0%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd			
2,4-Dimethylphenol	2.0	nd		nd	98%	102%	4%
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	120%	117%	3%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	104%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	76%	81%	6%
2-Methylnaphthalene	2.0	nd		nd			
1-Methylnaphthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinitrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	105%	nd	97%	98%	1%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd	79%	80%	1%
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	105%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	111%	nd			
Pyrene	0.2	nd		nd	92%	92%	0%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	91%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd		nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel: (425) 957-9872, Fax: (425) 957-9904

Client: Washington Department of Fish and Wildlife
Client Job Name: Byron Ponds

Analytical Results

8270, µg/L	MTH BLK		LCS Byron Ponds		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	04/09/08	04/09/08	04/07/08	04/09/08	04/09/08	
Date analyzed	Limits	04/09/08	04/09/08	04/09/08	04/09/08	04/09/08	
Sample collected				04/01/08			

Surrogate recoveries

2-Fluorophenol	79%		124%	87%	86%
Phenol-d6	75%		116%	89%	89%
Nitrobenzene-d5	106%	104%	105%	86%	83%
2-Fluorobiphenyl	93%	114%	107%	86%	85%
2,4,6-Tribromophenol	83%		106%	91%	92%
4-Terphenyl-d14	95%	120%	103%	89%	86%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %
Phenol - d6: 10-135 %
2,4,6-tribromophenol: 29-159%
Nitrobenzene - d5: 20-120 %
2-Fluorobiphenyl: 50-150%
p-Terphenyl-d14: 50-150%
Acceptable RPD limit: 35%

**CEE CEE AH CREEK
POST-REHABILITATION REPORT**

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Project Description and Purpose

Water Name:

Cee Cee Ah Creek

Geographic Location:

Pend Oreille County – Section(s) 1, 11, 12, 14, 15, 21, 22, and 28, Township 34 North, Range 44 East

Date(s) Treated:

September 8-12, 2008 (Treatment 1) and September 22-26, 2008 (Treatment 2)

The Washington Department of Fish and Wildlife (WDFW) and Kalispel Tribe of Indians Natural Resources Department (KNRD) attempted to eradicate, through the use of the piscicide rotenone, non-native brook trout from Cee Cee Ah Creek (Figure 1) and will reintroduce a native fish species assemblage.

Competition and/or introgression with non-native salmonids are among the primary factors associated with the loss of native cutthroat trout populations. Brook trout may have a larger impact on native cutthroat trout than any other non-native salmonid (Griffith 1988). Brook trout introductions in Yellowstone National Park have nearly always resulted in the disappearance of the native cutthroat trout population (Varley and Gresswell 1988).

Stocking of non-native salmonids (primarily brook trout) in Pend Oreille River tributaries has occurred since 1933 (WDFW unpublished data). Since 1995, KNRD has sampled 274 sites in Pend Oreille River tributaries; westslope cutthroat trout were observed in only 50% of the sites. Of the 137 sites where westslope cutthroat trout were present, 45 (33%) of the sites contained isolated allopatric populations. Mean cutthroat trout density in allopatric sites (mean 14.4 fish/100m²) was significantly greater than westslope cutthroat density in sites sympatric with brook trout (mean 4.4 fish/100m², $P < 0.001$ by t test).

Because of negative interactions with brook trout, westslope cutthroat trout may have recently been extirpated in a handful of tributary streams to the Pend Oreille River. A survey conducted in 1996 in upper Cee Cee Ah Creek found 1 cutthroat trout and 118 brook trout in six 30-meter snorkel survey stations. In seven years of snorkel surveys to monitor habitat enhancement sites, KNRD observed only 3 cutthroat trout while brook trout numbered 1,767. Finally, in 2002 KNRD sampling crews electrofished upper Cee Cee Ah Creek to obtain cutthroat trout samples for genetic analysis; despite a comprehensive effort that extended into the headwaters beyond occupied habitat, no cutthroat trout were captured.

The extirpation of westslope cutthroat from Cee Cee Ah Creek is likely the result of an expanding brook trout population. In an attempt to reverse the downward trend in westslope cutthroat populations in Cee Cee Ah creek, the upper 5.15 miles of the creek was treated with rotenone to eliminate brook trout and a native westslope cutthroat trout population will be re-established.

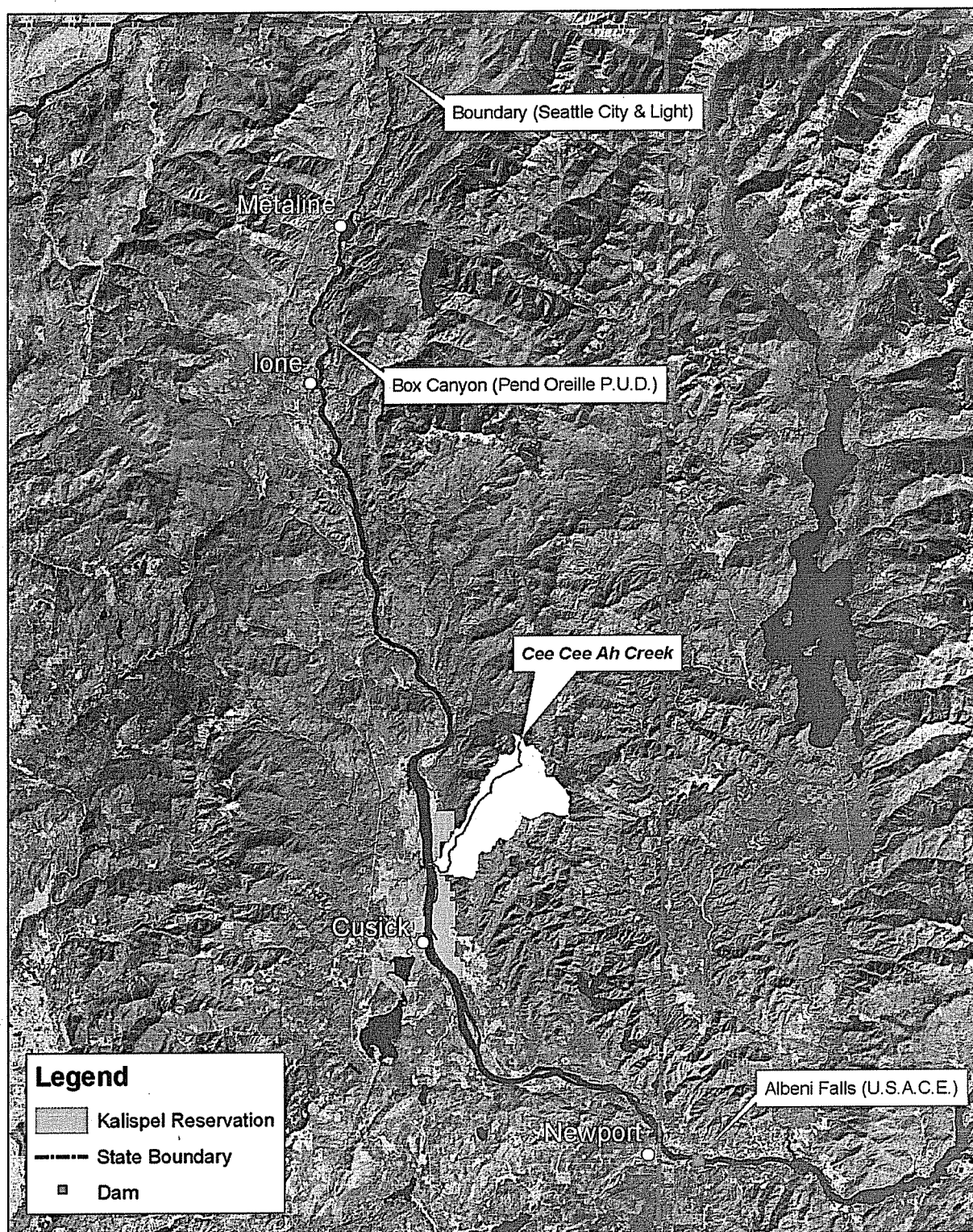


Figure 1 Pend Oreille River from Pend Oreille Lake to Canadian Border including Cee Cee Ah Creek Watershed

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This project was a model project to determine the efficacy of removing brook trout from Pend Oreille River tributaries using rotenone, and re-establishing native westslope cutthroat trout. The treatment reach is upstream of an impassable falls preventing the natural reinvasion of non-native species currently present in lower Cee Cee Ah Creek. Detoxification of rotenone occurred at the barrier falls and below the falls using potassium permanganate to prevent downstream fish mortality.

Upper Cee Cee Ah Creek (Figure 2) was treated twice in September 2008 with liquid rotenone at a concentration of 1.0 parts per million (ppm) and 0.5 ppm respectively. Rotenone was applied using California Drip Cans spaced approximately one-hour flow time apart throughout the treatment area. Backpack sprayers and powdered rotenone sand-mixture were used to treat backwater and spring areas. During treatment the stream was closed to angling and other recreational uses.

The native westslope cutthroat trout population will be re-established by 2012 with locally adapted stocks at densities to be determined by the managers. No removal of dead fish was planned as the nutrient base contained therein was best returned to the stream.

Biological assessments of standing biomass of brook trout were conducted prior to treatment (Attachment C). Post-treatment monitoring of presence/absence of brook trout will be conducted in spring and summer of 2009 to determine efficacy of the treatment. If brook trout are present the stream will be treated with rotenone again in 2009.

Physical Characteristics of Cee Cee Ah Creek

Pre-treatment water quality parameters were collected from multiple sites within the project area (Figure 2). Physical Parameters for the treatment reach were surveyed once prior to implementation of the project (Table 1). It was assumed that minimal change of physical parameters occurred between Treatments.

Table 1. Water quality parameters collected for Cee Cee Ah Creek including temperature, dissolved oxygen, pH, specific conductivity, turbidity and flow (cfs).

SITE	DATE	TEMP(C)	DO mg/L	pH units	SP COND us/cm	TURB Ntus	CFS
Below Ponds	09/03/2008	6.77	9.97	6.77	28.02	5.8	0.28
CCA2	09/02/2008	7.00	10.12	7.52	50.89	0.7	0.97
CCA2	09/04/2008	6.71	10.08	7.31	51.43	0.4	0.86
CCA1A	09/04/2008	8.55	10.21	7.46	55.83	1.7	1.07
BRN2	09/02/2008	10.35	9.47	7.51	56.50	1.1	5.20
BRN1	09/04/2008	9.02	10.16	7.03	66.08	0.0	5.96

DEPARTMENT OF ECOLOGY

MAY 15 2000
WATER QUALITY PROGRAM

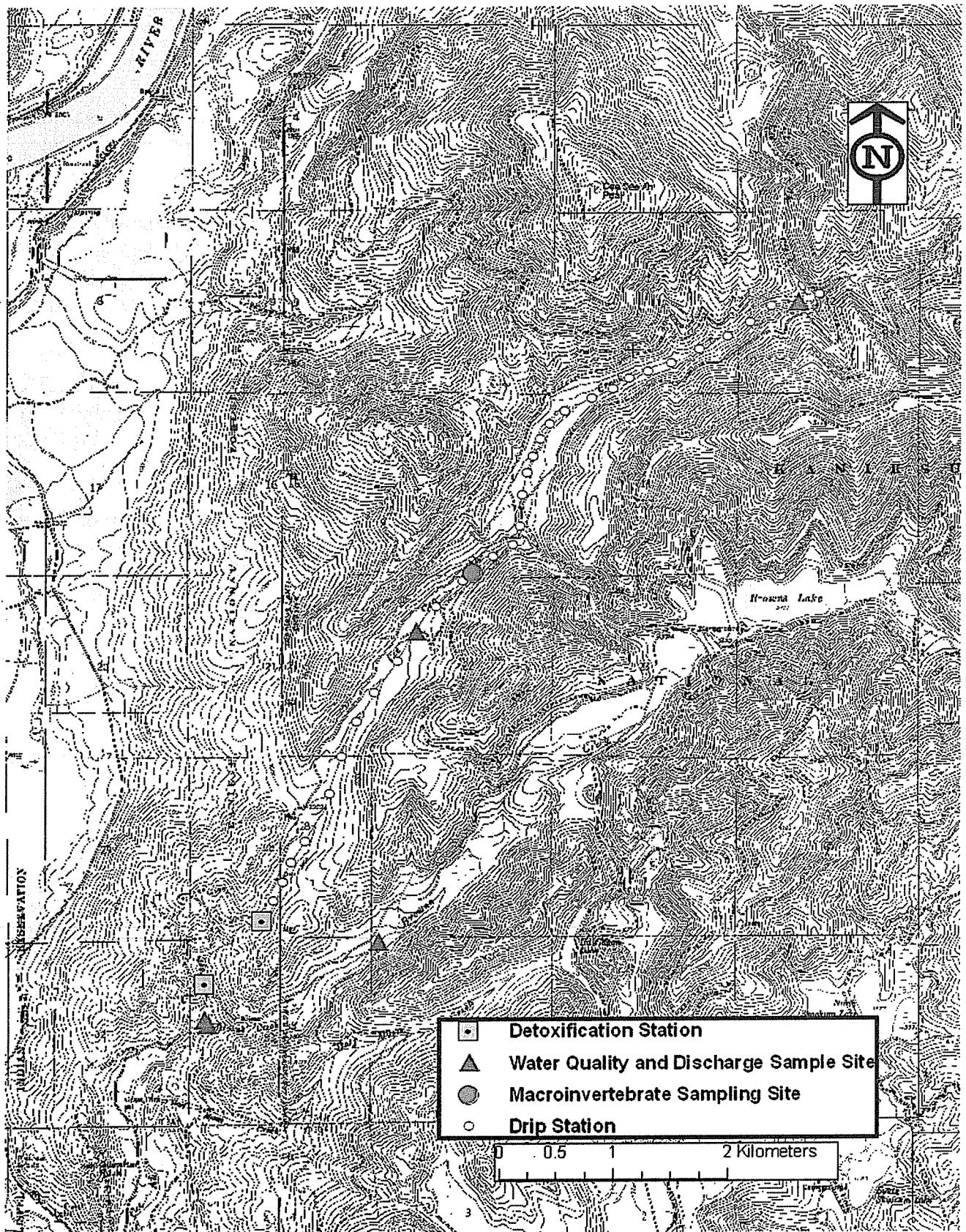


Figure 2 Cee Cee Ah Creek Project Location including drip station locations, detoxification station locations, water quality and discharge sample sites and macroinvertebrate sample sites.

Rotenone Treatment

Treatment Design

5.15 miles of Cee Cee Ah Creek was designated for rotenone treatment (Figure 2). This section of stream was selected for brook trout eradication because it was located above a barrier falls that eliminated the likelihood that brook trout would re-colonize the stream naturally.

On October 18, 2007, dye tracing was conducted to ascertain flow time from the start of the treatment section to the barrier falls. Rhodamine tracing dye was placed into the creek and followed for the length of the treatment reach. GPS waypoints were taken for each one hour flow increment over the length of the treatment reach. It was determined that the flow period from start to finish was approximately 31 hours (Attachment A).

The treatment reach was broken into 31 sections with a mean flow time of 1 hour per section (Figure 2). Each treatment section was demarcated with GPS coordinates. Prior to implementation of the project most treatment sections had trails cleared to the top of the treatment reach, and were identified with trail flagging to facilitate section location for implementation staff.

Treatment implementation timing was chosen to treat the stream at the low flow period for the year (Table 2). Low flow period was chosen to limit the amount of rotenone required to effectively treat the stream, to concentrate target fishes in the channel limiting fish avoidance capabilities in backwaters and seep areas, to decrease the amount of potassium permanganate (KMnO_4) used for detoxification, and to decrease detoxification complexity and likelihood of failure of the detoxification process.

Toxicant Used

Rotenone – Cube powdered Fish Toxicant EPA Reg # 6458-6, Liquid CFT Legumine EPA Reg # 75338-2.

Application Method(s)

Powdered rotenone (7.4 percent active ingredient) was used for sand mixture. The sand mixture formula was a combination of one pound powered rotenone to one pound clean sand to two ounces of gelatin and the appropriate amount of water to make a dry mud mix. Approximately 16 pounds (8 pounds of powdered rotenone) of rotenone sand mixture was used per treatment. Sand mixture was applied to seeps and springs for slow release of rotenone into those areas that recharged with groundwater too rapidly to retain lethal doses of liquid rotenone, or were disconnected from the channel preventing fish exposure to a constant flow of treated water.

Liquid rotenone (5 percent active ingredient) was dispensed from California drip cans directly into the stream. In addition, crews treated backwaters and springs with backpack sprayers. Liquid rotenone was discharged at a rate to keep a constant concentration of approximately 1ppm in the entire treatment reach (Table 1). Liquid rotenone was also placed in two small headwater ponds. Approximately 0.50 gallons were applied to the upper pond and 0.35 gallons were applied to the lower pond. Total liquid rotenone used for Treatment 1 was 3.65 gallons. Total liquid rotenone used for Treatment 2 was 2.45 gallons.

Rotenone Application Implementation

There were two treatments conducted on the treatment reach and headwater ponds. Treatment 1 commenced at 11 am on September 9, 2008 and ended 35 hours later. Treatment 2 commenced at 10 am September 23, 2008 and ended 35 hours later.

The treatment reach was broken into 31 treatment sections. Each treatment section was outfitted with a treatment packet. Contained in the packet was a 5 gallon California drip can, 500 ml screw top rotenone vessel with the prescribed amount of rotenone for the assigned treatment reach, safety gear (protective glasses, rubber gloves), 1000 ml graduated cylinder, handheld VHF radio, stopwatch, flashlight, notebook, pencils, and a 5-gallon bucket.

California drip cans were deployed at each reach start, with prescribed amounts of rotenone to be dripped into the creek during a 4 hour treatment period (Table 2). Each assigned treatment staff member was designated to charge the drip can with the prescribed amount of rotenone and top the drip can off with water. The action from filling the can with water was assumed to mix the rotenone thoroughly into solution so that it was consistently delivered to the stream during the 4 hour treatment period. The California drip can outlet had an adjustable outlet valve allowing flow from the drip can to be calibrated. Flow from the drip can was calibrated using a 1000 ml graduated cylinder and stopwatch. The flow rate to empty the 5-gallon drip can into the creek during a 4 hour treatment period at the prescribed concentration was 78 ml/minute.

In concert with the drip cans, rotenone was distributed by roving teams outfitted with rotenone sand mixture and liquid rotenone 5-gallon backpack sprayers. Two teams were deployed during Treatment 1 to treat backwaters, side channels and seep areas. During Treatment 1 it was determined that a considerably larger area than anticipated required attention from the roving teams. Therefore, four roving teams were deployed during Treatment 2 for the same task.

All staff was directed to arrive at their assigned station 30 minutes prior to implementation time to set up and prepare for dispersal of rotenone. Treatments began simultaneously to facilitate thorough application of the rotenone. Treatment 1 started at 11:00 am and Treatment 2 started at 10:00 am. Because of the size and scope of the project up to 37 staff were involved during the treatments (Attachment B). To comply with the Washington Department of Agriculture pesticide application regulations there were up to 14 licensed pesticide applicators involved in each treatment. Licensed Applicators were distributed in the project area to provide for eyeshot and earshot coverage of the project staff. All staff, including licensed applicators, were outfitted with handheld radios to facilitate safety and effective communication between and amongst implementers of the project.

Rotenone Bioassay

Every even numbered treatment station received a bioassay cage and five live brown trout to allow for observation of rotenone delivery and toxicity timing for each treatment reach. Live boxes were placed at the upstream end of each even numbered reach and applicators were instructed to take detailed notes on when fish appeared to be affected by rotenone (erratic behavior) and when they succumbed to rotenone (loss of equilibrium). This measure was taken to determine if flow time calculations were correct for each treatment reach. For each bioassay station during Treatment 1 the mean time to recognizing rotenone exposure behaviors was 1.07 hours from commencement of the project and the mean time for loss of equilibrium was 1.29 hours from commencement of the project.

Two small headwater ponds were treated with rotenone using a 10-foot canoe and backpack sprayers. Mean size for the two ponds was approximately 1 acre, and mean depth was approximately 2 feet. Treatment time was concurrent with treating the stream. Very few fish were found dead or dying in these small ponds.

Table 2. Section number, flow (cfs) for each section during time of treatment and milliliters of rotenone applied per section for each treatment.

Section Number	Flow (cfs)	Treatment 1 ml of rotenone	Treatment 2 ml of rotenone	Section Number	Flow (cfs)	Treatment 1 ml of rotenone	Treatment 2 ml of rotenone
1	0.5	204	102	17	0.85	346	173
2	0.5	204	102	18	0.85	346	173
3	0.5	204	102	19	1.0	408	204
4	0.75	306	153	20	1.0	408	204
5	0.75	306	153	21	1.0	408	204
6	0.75	306	153	22	1.0	408	204
7	0.75	306	153	23	1.0	408	204
8	0.75	306	153	24	1.0	408	204
9	0.75	306	153	25	1.0	408	204
10	0.75	306	153	26	1.0	408	204
11	0.75	306	153	27	1.0	408	204
12	0.75	306	153	28	1.0	408	204
13	0.85	346	173	29	1.0	408	204
14	0.85	346	173	30	1.0	408	204
15	0.85	346	173	31	0.75	306	153
16	0.85	346	173	Total	-----	10644 ml	5322 ml

Rotenone Detoxification

Detoxification Design and Implementation

Detoxification was done at two locations using potassium permanganate (KMnO_4). Station 1, was placed at the barrier waterfall and Station 2, 30 minutes flow time downstream (Figure 2). Two detoxification stations were utilized to prevent accidental distribution of rotenone beyond the project area. During both treatments there were no dead or distressed fish found beyond the prescribed treatment area.

Detoxification for each treatment was initiated one half hour prior to delivery of rotenone to the stream and was conducted for 35 hours to assure that undetectable amounts of rotenone were present at cessation of detoxification.

Application Method and Rate

At Station 1, KMnO_4 was dispersed into the stream using a "Mini-Typhoon" sump pump (manufactured by Proactive Environmental Products). Flow from the pump was controlled with a 12-volt low flow sampling controller. The low flow sampling controller allowed for incremental

adjustment of KMnO_4 into the creek. At Station 2, KMnO_4 was dispersed into the stream using a drip bucket. A small hole ($\sim 3/32$ of an inch) was drilled into the bottom of the bucket to allow for constant drip of liquefied KMnO_4 . KMnO_4 solution level in the bucket was kept full to maintain constant head pressure and flow rate.

Based on biochemical organic demand (BOD) and rotenone concentration, detoxification in the stream required 3.0 ppm KMnO_4 , 1.0 ppm to neutralize the rotenone and 2.0 ppm to account for the BOD. Both detoxification stations were scheduled to deliver 3ppm concentration of KMnO_4 . However during Treatment 1, to compensate for organic demand, and to assure that the rotenone was entirely oxidized before leaving the project area, Station 1 was operated at 4.5 ppm of KMnO_4 until the organic demand was oxidized between the two detoxification stations. KMnO_4 color reached Station 2 at approximately detoxification hour six, at this point the KMnO_4 concentration at Station 1 was lowered to 3 ppm. Both stations during Treatment 1 delivered the constant rate of 3ppm post treatment hour six. During Treatment 2 the concentration for both detoxification stations remained at a constant 3 ppm.

A 2.5 percent solution of KMnO_4 was used for both treatments. To create a 2.5 percent solution 1.01 pounds of KMnO_4 was mixed with 5 gallons of water. To keep KMnO_4 in solution, constant agitation was required. KMnO_4 2.5 percent solution was dripped into the creek with a flow of 1cfs at a rate of 210 ml/min to maintain a concentration of 3ppm, and at 325 ml/min to maintain a concentration of 4.5 ppm (Table 3).

Determination of Biochemical Organic Demand

Determination of Biochemical Organic Demand (BOD) was done using the guidelines in Engstrom-Heg (1971) for measuring organic demand of KMnO_4 , a titration of KMnO_4 into the waters of Cee Cee Ah Creek was performed. 10mg of KMnO_4 were dissolved into 1,000 ml of water to create a solution of 10,000 ppm. This solution was diluted three times at 10:1 to create a 10 ppm solution. The 10-ppm solution was further diluted into a 1,000 ml beaker to create dilutions of 1.0, 1.5, 1.6, 1.7, 1.8, 1.9, 2.0, 2.1, 2.2, and 2.5 ppm. The 10 measured solutions were titrated with Cee Cee Ah Creek water for 20 minutes each. After the 20 minute titration, color had been removed from the water in the 1.0, 1.5, 1.6, 1.7, 1.8, and 1.9 ppm solutions, but remained in the 2.0, 2.1, 2.2, and 2.5 ppm solutions. Therefore the biochemical organic demand of Cee Cee Ah Creek water was determined to be between 1.9 and 2.0 ppm for KMnO_4 .

Detoxification Bioassay

A bioassay box was placed 5 meters upstream of Detoxification Station 1, and 20 meters upstream and downstream of Station 2. For Station 1 during Treatment 1, based on bioassay box and rapidity of fish response to rotenone, toxicity levels of rotenone at Station 1 reached a peak concentration of 1.5 ppm at hour 12 of detoxification. Concentrations dropped to approximately 1 ppm by hour 20 and slowly reduced to trace or 0 by hour 35.

For Station 2 during Treatment 1, the bioassay box 20 meters above Station 2 experienced a fish kill at approximately detoxification hour 6.5. This kill was likely due to a "slug" of rotenone that was not oxidized by the KMnO_4 . The fish were replaced in the bioassay box and no further mortality was observed for the duration of the treatment. Concurrently, the bioassay box 20 meters below Station 2 did not have a fish kill. The presence of the secondary detoxification station delivering an additional 3ppm of KMnO_4 prevented the dispersal of rotenone out of the project area. The

technique of using multiple detoxification sites likely aided in preventing any unwanted fish kills below the project area.

Bioassay at both detoxification stations was conducted; cessation of the detoxification was only done post survival of fish at the bioassay 5 meters above Station 1 for 1 hour of exposure to stream water. Survival of bioassay fish at Station 1 did not occur for either treatment until treatment hour 35.

Table 3. Potassium permanganate distribution rates, and required amounts in volume and poundage for the duration of each treatment.

CFS	ml/min	Gallons/35 hours	Lbs/35hrs	Lbs/5 gal
1	210	116.51	23.56	1.01
0.95	199.5	110.69	22.38	1.01
0.9	189	104.86	21.21	1.01
0.85	178.5	99.04	20.03	1.01
0.8	168	93.21	18.85	1.01
0.75	157.5	87.38	17.67	1.01
0.7	147	81.56	16.49	1.01
0.65	136.5	75.73	15.32	1.01
0.6	126	69.91	14.14	1.01
0.55	115.5	64.08	12.96	1.01
0.5	105	58.26	11.78	1.01
0.45	94.5	52.43	10.60	1.01
0.4	84	46.61	9.42	1.01
0.35	73.5	40.78	8.25	1.01
0.3	63	34.95	7.07	1.01
0.25	52.5	29.13	5.89	1.01
0.2	42	23.30	4.71	1.01
0.15	31.5	17.48	3.53	1.01
0.1	21	11.65	2.36	1.01
0.05	10.5	5.83	1.18	1.01

Pre and Post Treatment Monitoring (All monitoring was conducted as outlined in WDFW's NPDES permit WA0041009)

Impact to Non-targeted Organisms

According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of populations' averages 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and reptiles are affected somewhat less so. Almost no chance of eliminating an entire amphibian population exists. Livestock use of the waters to be treated will not be significantly affected. The concentration of rotenone used in the treatment was far below that considered harmful to mammals.

Invertebrates were sampled in accordance to the Washington Department of Ecology NPDES permit standards. See sample site as indicated in Figure 2. Sample analysis is in progress at the time of completion of this document. Final results will be included in future reporting.

Liquid Rotenone Formulation Longevity

Water samples were taken at 24 hours post treatment and on March 9, 2009. The secondary sample was to be taken one month post treatment, but weather and road conditions precluded our ability to access areas to take the sample. The final sample was taken on March 10, 2009, when road conditions allowed access to the treatment area.

Samples are taken to check for residues related to the carriers present in the liquid formulation of rotenone. Water samples were taken in areas of the creek where the heaviest concentrations of liquid rotenone were applied. Samples were sent to an accredited lab for analyses per EPA methods. Samples were analyzed for methyl pyrrolidone and 117 volatile and semi-volatile organic compounds, including, benzene, toluene, phenol, xylene, and derivatives of these compounds, and detection limits were 0.02-3.0 µg/l, variously. In samples taken from Cee Cee Ah Creek there were no detections of volatile or semi-volatile organic compounds or methyl pyrrolidone.

Period of Toxicity

The bioassay station was 20 meters upstream of Detoxification Station 2 (Figure 2). Bioassay for Cee Cee Ah Creek was conducted 24 hours post treatment for both Treatment 1 and Treatment 2. Each bioassay was conducted using 5 brown trout for a duration of 48 hours. There were no observed mortalities of fish during either bioassay event (Table 4).

Table 4 Bioassay Dates and Times for Cee Cee Ah Creek Project.

Treatment 1							
Site	No. Fish	Species	Start Date	Start Time	End Date	End Time	No. Mortalities
Station 30	5	Brown Trout	15-Sep	1000	17-Sep	1530	0
Treatment 2							
Site	No. Fish	Species	Start Date	Start Time	End Date	End Time	No. Mortalities
Station 30	5	Brown Trout	30-Sep	930	02-Oct	1500	0

Attachment A.-Dye Tracing and Flow Time Calculations for Cee Cee Ah Creek Treatment Reach.

Section	Length (m)	Cumulative Distance (m)	Cumulative Miles	Cumulative Hours
1	100	100	0.062	0.4
2				
3	100	200	0.124	0.7
4	100	300	0.186	1.1
5	100	400	0.248	1.5
6	200	600	0.372	2.3
7	100	700	0.434	2.7
8	100	800	0.496	2.9
9	100	900	0.558	3.2
10	100	1000	0.62	3.6
11	100	1100	0.682	3.9
12	100	1200	0.744	4.3
13	100	1300	0.806	4.7
14	100	1400	0.868	5.1
15	100	1500	0.93	5.6
16	100	1600	0.992	6.2
17	100	1700	1.054	6.7
18	100	1800	1.116	7.3
19	100	1900	1.178	7.8
20	100	2000	1.24	8.1
21	100	2100	1.302	8.4
22	100	2200	1.364	8.8
23	100	2300	1.426	9.2
24	100	2400	1.488	9.8
25	100	2500	1.55	10.3
26	100	2600	1.612	10.9
27	100	2700	1.674	11.6
28	270	2970	1.8414	13.1
29	100	3070	1.9034	13.5
30	100	3170	1.9654	14.0
31	100	3270	2.0274	14.4
32	100	3370	2.0894	14.8
33	100	3470	2.1514	15.0
34	100	3570	2.2134	15.4
35	100	3670	2.2754	15.7
36	100	3770	2.3374	16.0
37	100	3870	2.3994	16.3
38	100	3970	2.4614	16.7
39	100	4070	2.5234	17.2
40	100	4170	2.5854	17.4
41	100	4270	2.6474	17.7
42	100	4370	2.7094	18.0
43	100	4470	2.7714	18.2
44	125	4595	2.8489	18.4
45	100	4695	2.9109	18.8
46	100	4795	2.9729	19.1
47	100	4895	3.0349	19.3
48	100	4995	3.0969	19.6
49	100	5095	3.1589	20.0

Section	Length (m)	Cumulative Distance (m)	Cumulative Miles	Cumulative Hours
50	100	5195	3.2209	20.3
51	100	5295	3.2829	20.6
52	100	5395	3.3449	21.0
53	100	5495	3.4069	21.2
54	100	5595	3.4689	21.5
55	100	5695	3.5309	21.7
56	100	5795	3.5929	22.1
57	100	5895	3.6549	22.5
58	100	5995	3.7169	22.7
59	100	6095	3.7789	23.0
60	100	6195	3.8409	23.3
61	100	6295	3.9029	23.6
62	100	6395	3.9649	23.8
63	100	6495	4.0269	24.1
64	100	6595	4.0889	24.3
65	100	6695	4.1509	24.6
66	100	6795	4.2129	24.9
67	100	6895	4.2749	25.1
68	100	6995	4.3369	25.3
69	100	7095	4.3989	25.5
70	100	7195	4.4609	25.7
71	100	7295	4.5229	25.9
72	100	7395	4.5849	26.1
73	100	7495	4.6469	26.4
74	100	7595	4.7089	27.1
75	400	7995	4.9569	29.9
76	100	8095	5.0189	30.3
77	100	8195	5.0809	30.6
78	100	8295	5.1429	30.8
79	20	8315	5.1553	30.8

Attachment B. - Staff and Licensed Applicators. Including staff member(s) name, employer, pesticide applicator license number and assignment per treatment.

Name	Employer	License #	Treatment 1 Assignment and/or Section Number	Treatment 2 Assignment and/or Section Number
Jeff Korth	WDFW	39429	Detoxification	Detoxification
Robert Jateff	WDFW	74965	Detoxification	-
Jon Anderson	WDFW	69176	Detoxification	Detoxification
Randall Osborne	WDFW	74886	1 and 2	31
Marc Divens	WDFW	74881	11 and 12	4
Chris Donley	WDFW	65173	Project Coordinator/Detoxification	Project Coordinator/Detoxification
Nick Bean	KNRD	76922	9	-
Jason Connor	KNRD	76923	Biological Assessment	28 and 29
Todd Andersen	KNRD	76903	Backpack Sprayer	Backpack Sprayer/Detoxification
Ken Merrill	KNRD	76929	19 and 20	5
Dan McMeekan	KNRD	76904	3 and 4	3
Joe Maroney	KNRD	76928	Backpack Sprayer	Backpack Sprayer/Detoxification
Michele Wingert	KNRD	76906	14	12 and 13
Jason Olson	KNRD	76930	Biological Assessment	X
Bruce Bolding	WDFW		-	1 and 2
Paul Sieracki	KNRD		-	6
Dan McRae	KNRD		-	7 and 8
Tim Rood	KNRD		5	9 and 10
Cyrus Rosenthal	KNRD		-	11
Shane Harvey	KNRD		6	14
Rod Haynes	KNRD		16 and 17	15 and 16
Louie Andrews	KNRD		31	17 and 18
Ray Entz	KNRD		-	19 and 20
Jim Lemieux	KNRD		21	21 and 22
Mike Wilkinson	WDFW		-	23
Wayne Gould	KNRD		-	24
Heather Stieglmeyer	KNRD		18	25
Chuck Littlecrow	KNRD		Backpack Sprayer	26
Sandy Dotts	WDFW		28	27
Jake Wolfe	WDFW		Detoxification	Detoxification
Bill Baker	WDFW		22 and 23	Backpack Sprayer
James Lord	KNRD		Backpack Sprayer	Backpack Sprayer
Taj Salmeri	KNRD		Backpack Sprayer	Backpack Sprayer
Todd Baldwin	KNRD		-	Backpack Sprayer
Doug Marconi	KNRD		10	-
Jake Streich	KNRD		-	Backpack Sprayer
Mike Holm	WDFW		-	Bio-Assay Support
Jeff Lombard	WDFW		Bio-Assay Support	-
Karen Honeycutt	USFS		15	-
Jade Helm	WDFW		13	-
Lawrence Williams	KNRD		24	-
John Easterbrooks	WDFW		30	-
Eric Anderson	WDFW		7 and 8	-
Dave Karl	WDFW		27	-
Doug Weidemeir	WDFW		26	-
Jeff Lawlor	WDFW		25	-
Bruce Heiner	WDFW		29	-
John Pahutski	WDFW		-	30/Detoxification

Attachment C. – Pre and Post Treatment Fish Population Monitoring

Cee Cee Ah Creek Westslope Cutthroat Trout Restoration Project Fish Population Assessment

By

Jason M Connor and Jason Olson
Kalispel Tribe Natural Resources Department

Pre-Implementation Fish Sampling

Prior to rotenone treatment of Cee Cee Ah Creek, the brook trout population was assessed using multiple pass depletion electrofishing techniques (Murphy and Willis 1996, Heimbuch et al. 1997). Daytime electrofishing was conducted on 21 August and 2 September 2008. Eight electrofishing stations were established in the planned treatment reach between Cee Cee Ah Falls and the headwaters. Stations measured between 50-100 m (mean 87.5 m), with block nets set at the upstream and downstream boundaries to prevent immigration and emigration during the sampling period (Zippen 1958).

Stations were distributed throughout the reach to capture the range of habitat conditions present, with the exception of impounded and braided portions of the stream. Backpack electrofishing of extensively braided low gradient channel segments and beaver pond complexes was logistically problematic and could not be closed to im/emigration which violates model assumptions. Therefore, these habitats were avoided. Brook trout density and biomass estimates from the electrofishing survey are considered conservative, given that previously observed fish densities in braided and impounded portions of the reach are consistently higher than locations sampled.

Population estimates were obtained using the MicroFish 2.2 Interactive Program, the interactive version of "Fisheries Population and Statistical Package" (Van Deventer and Platts 1986). The program uses the maximum likelihood population estimation model developed by Dr. Kenneth Burnham of North Carolina State University (Van Deventer and Platts 1985), and Zippin's (1958) removal-depletion strategy assumptions. Fish < 50 mm have been reported to pass through the mesh of our block nets, violating the closure assumption (McLellan and O'Connor 2003), and were excluded from analysis. Two electrofishing passes were completed if the second pass' total was less than 50% of the first. If the second pass' total was greater than 50%, a third pass was completed. Fish densities were calculated by dividing the population estimate by the sample section length and multiplying by 100 to yield #fish/100 m. All brook trout were measured to the nearest millimeter (mm) in total length (TL), and weighed to the nearest gram (g) on an Acculab electronic scale. Brook trout collected electrofishing were permanently removed from Cee Cee Ah Creek.

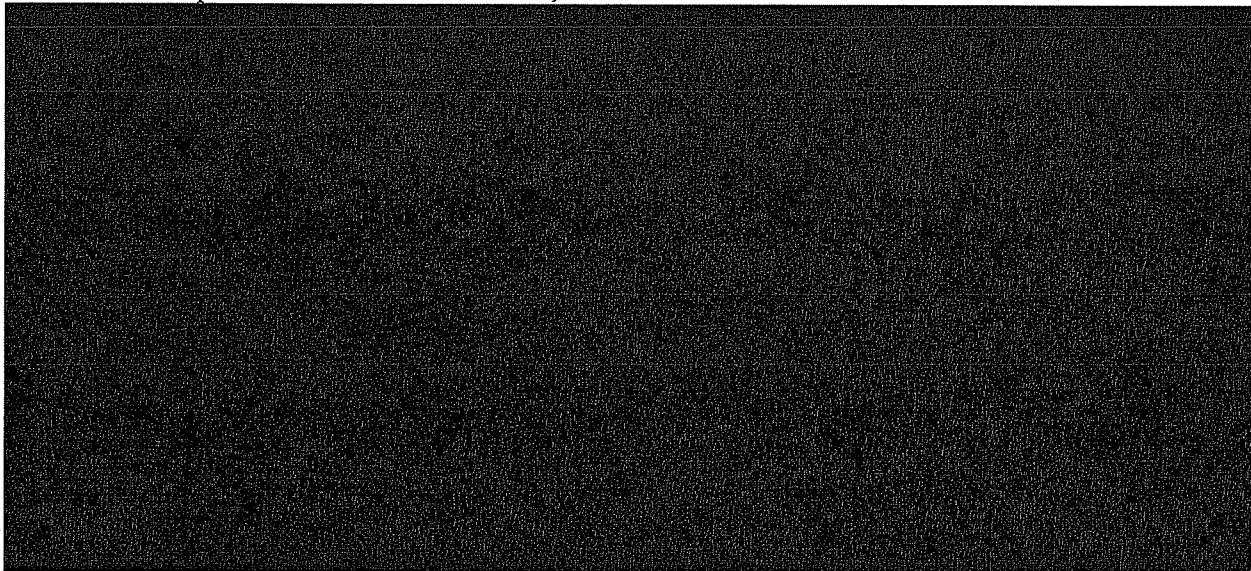
A total of 463 brook trout over 50 mm and 67 young-of-year (yoy; <50 mm) were collected in the eight electrofishing stations. Density estimates ranged from 38 fish/100 m to 126 fish/100 m and were not correlated to location within the treatment area (Table 1). Mean brook trout density was 74 fish/100 m (CI 66-86 fish/100 m).

Average total lengths of brook trout ranged from 98-131 mm with a pooled mean of 112 mm (Table 2, Figure 1). Average weights ranged from 14-26 g with a pooled mean of 18 g (Table 2).

Table 1. Pre-implementation brook trout electrofishing results with population and density estimates for Cee Cee Ah Creek, 2008.

A large rectangular area that has been completely redacted with a solid black fill, obscuring the data for Table 1.

Table 2. Mean total length and weight estimates including biomass of brook trout captured in Cee Cee Ah Creek prior to Rotenone treatment, 2008.

A large rectangular area that has been completely redacted with a solid black fill, obscuring the data for Table 2.

Post-Implementation Fish Sampling

Prior to the rotenone application, three 450-500 m sampling reaches were established within the treatment area. Lower, middle, and upper reaches were enclosed by block nets 1 day prior to treatment. Block nets were set perpendicular to the stream flow in simple channels (i.e. not braided, impounded, or obstructed) and anchored with rebar stakes and boulders. Immediately prior to treatment, block nets were inspected to ensure closure. During the rotenone application 1-2 passes were made through each reach and all brook trout carcasses were collected, weighed (g), and measured (mm TL). One additional pass was made 1 day following the treatment to collect remaining carcasses before block nets were removed.

In total, 1,097 brook trout >50 mm and 110 YOY brook trout <50 mm were collected in three sampling reaches. Density varied greatly and increased in upstream reaches from 30 fish/100 m (n=137) in the first to 49 fish/100 m (n=243) and 143 fish/100 m (n=717) in reaches 2 and 3, respectively (Table 4). The mean density of brook trout (74 fish/100 m) equaled the electrofishing estimate, although the 95% confidence interval for rotenone was far greater (± 151 fish) than electrofishing (± 28 fish).

The estimated size of the Cee Cee Ah brook trout population removed with rotenone was 6,733 individuals, calculated by pooling the three reaches and applying that density (75.6 fish/100 m) to the entire treatment area. We chose to pool the data because of high variability in the number of carcasses collected between reaches, small sample size (3 reaches), and the assumption that mortality was complete and 100% of carcasses were accounted for. Taking into account the high variability and calculating the population level based on mean density produces a population estimate of 6,598 fish (CI $\pm 13,410$). In comparison, the population size estimated from electrofishing was 6,586 individuals (CI 4,094-9,078).

Average total lengths of brook trout ranged from 107-116 mm with a pooled mean of 108 mm (Table 5, Figure 1). Average weights ranged from 15-19 g with a pooled mean of 16 g (Table 5). Brook trout biomass removed from each of the three reaches (from downstream to upstream) was 2.6 Kg, 3.6 Kg, and 11.6 Kg, respectively. The mean biomass density estimate was 12.1 Kg/Km corresponding to a total removal of 107.7 Kg of brook trout in the treatment area. In comparison, electrofishing estimates of biomass ranged from 6.3 Kg/Km to 22.5 Kg/Km with a mean biomass density estimate of 11.6 Kg/Km. Total brook trout biomass present in the treatment area estimated from electrofishing was 103.7 Kg (CI 64.3-143.0 Kg).

Table 4. Summary of post-implementation brook trout collection in Cee Cee Ah Creek, 2008.

	<i>Reach 1</i>	<i>Reach 2</i>	<i>Reach 3</i>	<i>Pooled</i>
Distance (m)	450	500	500	1450
No collected	137	243	717	1097
Density (#/100 m)	30	49	143	75.6

Table 5. Mean total length and weight estimates including biomass of brook trout collected in Cee Cee Ah Creek following Rotenone treatment, 2008.

Brook trout	Reach 1	Reach 2	Reach 3	Pooled
Total Length				
Mean	116	107	107	108
Standard dev.	35	27	30	30
Range	174	122	158	174
Minimum	50	50	50	50
Maximum	224	172	208	224
Weight				
Mean	19	15	16	16
Standard dev.	18	10	14	14
Range	127	51	99	127
Minimum	1	1	1	1
Maximum	128	52	100	128
Biomass (Kg)	2.63	3.61	11.62	17.86
Kg/Km	5.85	7.21	23.24	12.32

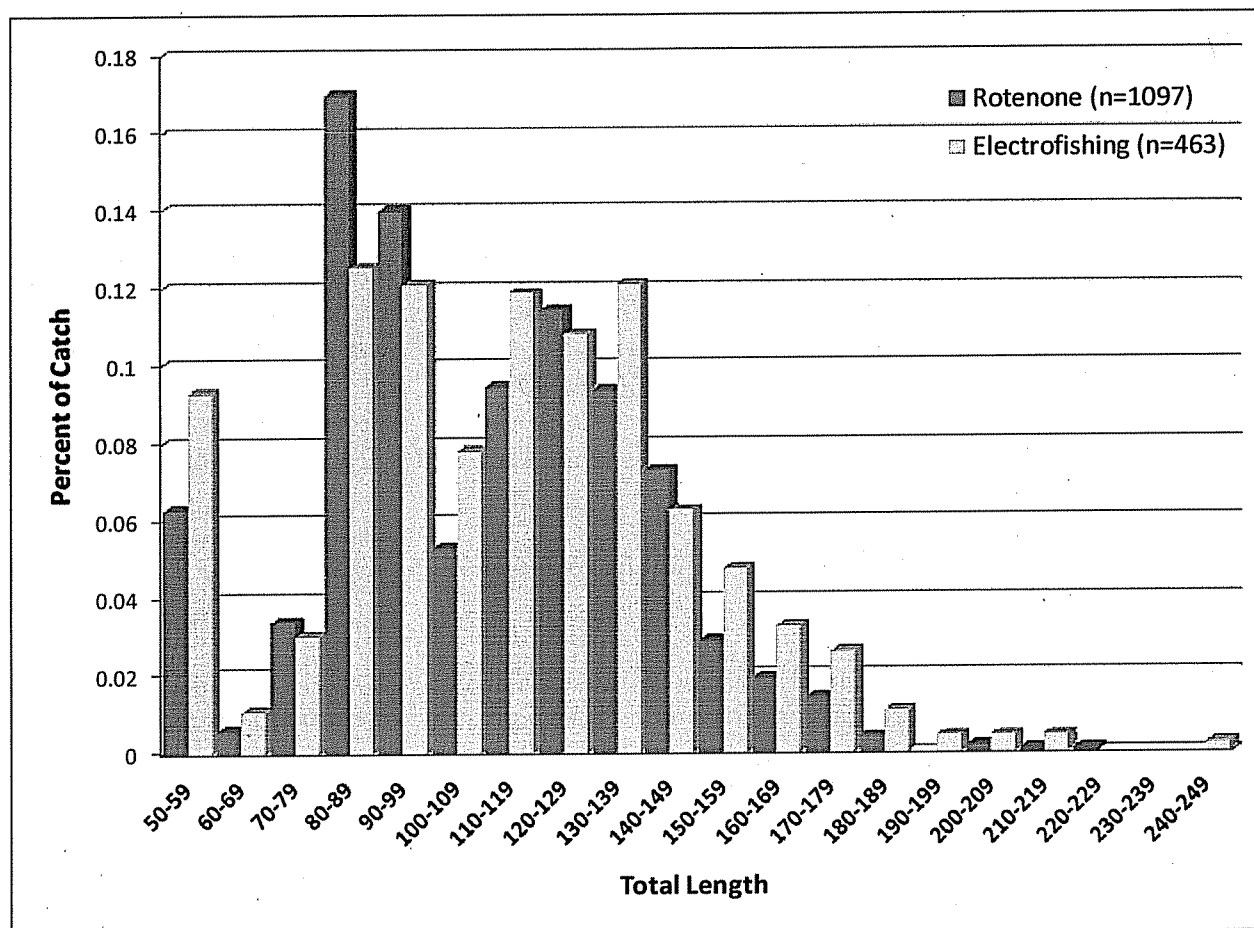


Figure 1. Length-frequency distribution of brook trout captured electrofishing prior to Rotenone treatment and collected immediately following Rotenone treatment in Cee Cee Ah Creek, 2008.

Conclusions

- Approximately 6,700 brook trout were removed from Cee Cee Ah Creek with rotenone.
- A conservative estimate of brook trout density prior to treatment was 74 fish/100 m.
- Cee Cee Ah creek supported approximately 12 Kg/Km of brook trout prior to treatment.
- Total estimated biomass of brook trout removed from the creek was 108 Kg.
- Multiple pass depletion electrofishing provided relatively accurate estimates of population size, density, and total biomass. Small differences in length frequency distribution and average total lengths and weights are attributed to electrofishing bias toward larger individuals, and the fact that we did not return any brook trout to the creek following electrofishing removal.

Literature Cited

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Attachment D. Photographs of Cee Cee Ah Creek Project

California drip can and contents of the treatment packet.



California drip can outlet nozzle and contents of the treatment packet.



Potassium permanganate and sump pump at detoxification Station 1



California drip can and contents of the treatment packet.



California drip can at work. Note: 2 plus feet vertical above stream to maximize flow from can.



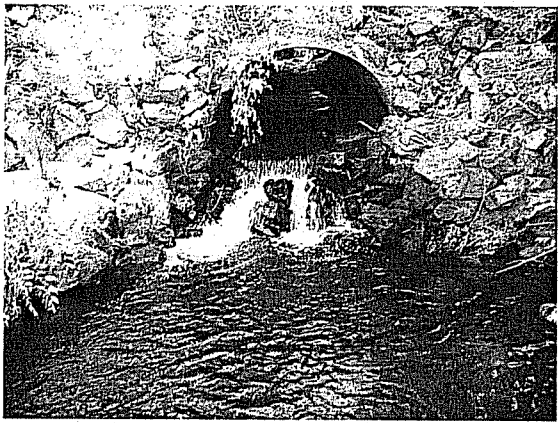
Potassium permanganate mixing at top of waterfall at detoxification Station 1



Mixing potassium permanganate into 2.5 percent solution



Activities at detoxification Station 2



Permanganate in water downstream of detoxification Station 2



Bioassay cage downstream of detoxification Station 2

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Analytical Results

8260, µg/L	MTH BLK	LCS	#1	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water
Reporting	Reporting	Reporting	Reporting	Reporting	Reporting	Reporting
Date analyzed	Limits	10/03/08	10/03/08	10/03/08	10/03/08	10/03/08
Dichlorodifluoromethane	1.0	nd	nd			
Chloromethane	1.0	nd	nd			
Vinyl chloride	0.2	nd	nd			
Bromomethane	1.0	nd	nd			
Chloroethane	1.0	nd	nd			
Trichlorofluoromethane	1.0	nd	nd			
1,1-Dichloroethene	1.0	nd	143%	147%	136%	7.8%
Methylene chloride	1.0	nd	nd			
trans-1,2-Dichloroethene	1.0	nd	nd			
1,1-Dichloroethane	1.0	nd	nd			
cis-1,2-Dichloroethene	1.0	nd	nd			
2,2-Dichloropropane	1.0	nd	nd			
Chloroform	1.0	nd	nd			
Bromochloromethane	1.0	nd	nd			
1,1,1-Trichloroethane	1.0	nd	nd			
1,2-Dichloroethane	1.0	nd	nd			
1,1-Dichloropropene	1.0	nd	nd			
Carbon tetrachloride	1.0	nd	nd			
Benzene	1.0	nd	96%	96%	135%	26%
Trichloroethene	1.0	nd	96%	88%	122%	32%
1,2-Dichloropropane	1.0	nd	nd			
Dibromomethane	1.0	nd	nd			
Bromodichloromethane	1.0	nd	nd			
cis-1,3-Dichloropropene	1.0	nd	nd			
Toluene	1.0	nd	130%	85%	114%	29%
trans-1,3-Dichloropropene	1.0	nd	nd			
1,1,2-Trichloroethane	1.0	nd	nd			
1,3-Dichloropropane	1.0	nd	nd			
Dibromochloromethane	1.0	nd	nd			
Tetrachloroethene	1.0	nd	nd			
1,2-Dibromoethane (EDB)(*)	0.01	nd	nd			
Chlorobenzene	1.0	nd	94%	96%	128%	29%
1,1,1,2-Tetrachloroethane	1.0	nd	nd			
Ethylbenzene	1.0	nd	nd			
Xylenes	1.0	nd	nd			
Styrene	1.0	nd	nd			
Bromoform	1.0	nd	nd			
1,1,2,2-Tetrachloroethane	1.0	nd	nd			
Isopropylbenzene	1.0	nd	nd			
1,2,3-Trichloropropane	1.0	nd	nd			
Bromobenzene	1.0	nd	nd			
n-Propylbenzene	1.0	nd	nd			
2-Chlorotoluene	1.0	nd	nd			
4-Chlorotoluene	1.0	nd	nd			
1,3,5-Trimethylbenzene	1.0	nd	nd			
tert-Butylbenzene	1.0	nd	nd			
1,2,4-Trimethylbenzene	1.0	nd	nd			
sec-Butylbenzene	1.0	nd	nd			
1,3-Dichlorobenzene	1.0	nd	nd			
1,4-Dichlorobenzene	1.0	nd	nd			
Isopropyltoluene	1.0	nd	nd			
1,2-Dichlorobenzene	1.0	nd	nd			
n-Butylbenzene	1.0	nd	nd			
1,2-Dibromo-3-Chloropropane	1.0	nd	nd			
1,2,4-Trichlorobenzene	1.0	nd	nd			
Naphthalene	1.0	nd	nd			
Hexachloro-1,3-butadiene	1.0	nd	nd			
1,2,3-Trichlorobenzene	1.0	nd	nd			

*Instrument detection limits

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Analytical Results

8260, µg/L		MTH BLK	LCS	#1	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	Water
	Reporting						
Date analyzed	Limits	10/03/08	10/03/08	10/03/08	10/03/08	10/03/08	

Surrogate recoveries

Dibromofluoromethane	116%	113%	125%	113%	119%
Toluene-d8	98%	103%	95%	102%	101%
4-Bromofluorobenzene	105%	107%	104%	106%	101%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 85% TO 135%
Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel: (425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S80930.1
Client: WDFW
Client Job Name: Stream Rehab

Analytical Results

8270, µg/L	MTH BLK	LCS	# 1	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	
Date extracted	Reporting	09/30/08	09/30/08	09/30/08	09/30/08	09/30/08
Date analyzed	Limits	09/30/08	09/30/08	09/30/08	09/30/08	09/30/08
Pyridine	2.0	nd	nd			
Aniline	2.0	nd	nd			
Phenol	2.0	nd	nd	88%	92%	4%
2-Chlorophenol	2.0	nd	nd	99%	113%	13%
Bis (2-chloroethyl) ether	2.0	nd	nd			
1,3-Dichlorobenzene	2.0	nd	nd			
1,4-Dichlorobenzene	2.0	nd	121%	102%	101%	1%
1,2-Dichlorobenzene	2.0	nd	nd			
N-methylpyrrolidone	2.0	nd	nd			
Benzyl alcohol	2.0	nd	nd			
2-Methylphenol (o-cresol)	2.0	nd	nd			
Bis (2-chloroisopropyl) ether	10.0	nd	nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd	nd			
Hexachlorethane	2.0	nd	nd			
N-Nitroso-di-n-propylamine	2.0	nd	nd	119%	118%	1%
Nitrobenzene	2.0	nd	nd			
Isophorone	2.0	nd	nd			
2-Nitrophenol	10.0	nd	nd			
4-Nitrophenol	10.0	nd	nd			
2,4-Dimethylphenol	2.0	nd	nd	100%	104%	4%
Bis (2-chloroethoxy) methane	2.0	nd	nd			
2,4-Dichlorophenol	10.0	nd	nd			
1,2,4-Trichlorobenzene	2.0	nd	nd	121%	118%	3%
Naphthalene	2.0	nd	nd			
4-Chloroaniline	10.0	nd	nd			
Hexachlorobutadiene	2.0	nd	132%			
4-Chloro-3-methylphenol	10.0	nd	nd	77%	80%	4%
2-Methylnaphthalene	2.0	nd	nd			
1-Methylnaphthalene	2.0	nd	nd			
Hexachlorocyclopentadiene	2.0	nd	nd			
2,4,6-Trichlorophenol	10.0	nd	nd			
2,4,5-Trichlorophenol	10.0	nd	nd			
2-Chloronaphthalene	2.0	nd	nd			
2-Nitroaniline	10.0	nd	nd			
1,4-Dinitrobenzene	10.0	nd	nd			
Dimethylphthalate	2.0	nd	nd			
Acenaphthylene	0.2	nd	nd			
1,3-Dinitrobenzene	10.0	nd	nd			
2,6-Dinitrotoluene	2.0	nd	nd			
1,2-Dinitrobenzene	2.0	nd	nd			
Acenaphthene	0.2	nd	110%	98%	99%	1%
3-Nitroaniline	10.0	nd	nd			
Dibenzofuran	2.0	nd	nd			
2,4-Dinitrotoluene	2.0	nd	nd	86%	88%	2%
2,3,4,6-Tetrachlorophenol	2.0	nd	nd			
2,3,5,6-Tetrachlorophenol	2.0	nd	nd			
2,4-Dinitrophenol	10.0	nd	nd			
Fluorene	0.2	nd	nd			

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel: (425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S80930.1
Client: WDFW
Client Job Name: Stream Rehab

Analytical Results

8270, µg/L	MTH BLK		LCS	# 1	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	09/30/08	09/30/08	09/30/08	09/30/08	09/30/08	
Date analyzed	Limits	09/30/08	09/30/08	09/30/08	09/30/08	09/30/08	
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	113%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	116%	nd			
Pyrene	0.2	nd		nd	93%	95%	2%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	71%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	75%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

Surrogate recoveries

2-Fluorophenol	98%	113%	124%	89%	89%
Phenol-d6	102%	118%	125%	94%	93%
Nitrobenzene-d5	111%	123%	86%	90%	89%
2-Fluorobiphenyl	90%	128%	80%	86%	85%
2,4,6-Tribromophenol	67%	77%	76%	84%	87%
4-Terphenyl-d14	92%	118%	78%	86%	84%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %
Phenol - d5: 10-135 %
2,4,6- tribromophenol: 29-159%
Nitrobenzene - d5: 20-120 %
2-Fluorobiphenyl: 50-150%
p-Terphenyl-d14: 50-150%
Acceptable RPD limit: 35%

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: ESN NORTHWEST
Address: 1210 EASTSIDE STREET SE
OLYMPIA, WA 98501
Attn: STEPHEN J LOAGUE

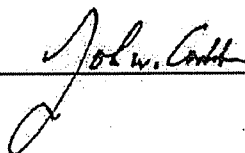
Batch #: 080916043
Project Name: CCA CREEK

Analytical Results Report

Sample Number	080916043-001	Sampling Date	9/11/2008	Date/Time Received	9/16/2008 11:30 AM
Client Sample ID	#2	Sampling Time	11:55 AM	Extraction Date	9/26/08
Matrix	Water	Sample Location			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Rotenone	ND	ug/L	0.1	9/26/2008	TGT	EPA 8321A	

Authorized Signature



MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C1320
Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C1287

Monday, September 29, 2008

Page 1 of 1

ESN NORTHWEST CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

Client: Washington Department of Fish and Wildlife
Client Job Name: CCA Creek

Analytical Results

8260, µg/L	MTH BLK		LCS	CCA Creek	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date analyzed	Limits	09/18/08	09/18/08	09/18/08	09/18/08	09/18/08	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
Acetone	10.0	nd		nd			
1,1-Dichloroethene	1.0	nd	108%	nd	110%	108%	2%
Methylene chloride	10.0	nd		nd			
Methyl-t-butyl ether (MTBE)	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
n-Hexane	1.0	nd		nd			
2-Butanone (MEK)	10.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	108%	nd	107%	107%	0%
Trichloroethene (TCE)	1.0	nd	107%	nd	107%	108%	1%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	106%	nd	109%	109%	0%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
2-Hexanone	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene (PCE)	1.0	nd		nd			
1,2-Dibromoethane (EDB)	0.10	nd		nd			
Chlorobenzene	1.0	nd	111%	nd	114%	111%	3%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	1.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

*-instrument detection limits

ESN NORTHWEST CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

Client: Washington Department of Fish and Wildlife
Client Job Name: CCA Creek

Analytical Results

8260, µg/L		MTH BLK	LCS	CCA Creek	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date analyzed	Limits	09/18/08	09/18/08	09/18/08	09/18/08	09/18/08	

Surrogate recoveries:

Dibromofluoromethane	131%	127%	127%	125%	127%
Toluene-d8	103%	103%	101%	103%	103%
4-Bromofluorobenzene	96%	96%	91%	96%	97%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

J - estimated quantitation, below listed reporting limits

Acceptable Recovery limits: 65% TO 135%

Acceptable RPD limit: 35%

ESN NORTHWEST CHEMISTRY LABORATORY
Tel: (425) 957-9872, Fax: (425) 957-9904

Client: Washington Department of Fish and Wildlife
Client Job Name: CCA Creek

Analytical Results

8270, µg/L	MTH BLK	LCS	# 1	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	
Date extracted	Reporting	09/17/08	09/17/08	09/17/08	09/17/08	09/17/08
Date analyzed	Limits	09/17/08	09/17/08	09/17/08	09/17/08	09/17/08
4-Chlorophenylphenylether	2.0	nd	nd			
Diethylphthalate	2.0	nd	nd			
4-Nitroaniline	10.0	nd	nd			
4,6-Dinitro-2-methylphenol	10.0	nd	nd			
N-nitrosodiphenylamine	2.0	nd	96%	nd		
Azobenzene	2.0	nd	nd			
4-Bromophenylphenylether	2.0	nd	nd			
Hexachlorobenzene	2.0	nd	nd			
Pentachlorophenol	10.0	nd	nd			
Phenanthrene	0.2	nd	nd			
Anthracene	0.2	nd	nd			
Carbazole	2.0	nd	nd			
Di-n-butylphthalate	2.0	nd	nd			
Fluoranthene	0.2	nd	130%	nd		
Pyrene	0.2	nd	nd	95%	98%	3%
Butylbenzylphthalate	2.0	nd	nd			
Bis(2-ethylhexyl) adipate	2.0	nd	nd			
Benzo(a)anthracene	0.2	nd	nd			
Chrysene	0.2	nd	nd			
Bis (2-ethylhexyl) phthalate	2.0	nd	nd			
Di-n-octyl phthalate	2.0	nd	70%	nd		
Benzo(b)fluoranthene	0.2	nd	nd			
Benzo(k)fluoranthene	0.2	nd	nd			
Benzo(a)pyrene	0.2	nd	83%	nd		
Dibenzo(a,h)anthracene	0.2	nd	nd			
Benzo(ghi)perylene	0.2	nd	nd			
Indeno(1,2,3-cd)pyrene	0.2	nd	nd			
Surrogate recoveries						
2-Fluorophenol		101%	114%	128%	89%	89%
Phenol-d6		103%	119%	134%	94%	94%
Nitrobenzene-d5		113%	119%	105%	92%	90%
2-Fluorobiphenyl		90%	130%	98%	86%	86%
2,4,6-Tribromophenol		66%	87%	73%	83%	86%
4-Terphenyl-d14		94%	114%	94%	87%	86%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %

Phenol - d5: 10-135 %

2,4,6-tribromophenol: 29-159%

Nitrobenzene - d5: 20-120 %

2-Fluorobiphenyl: 50-150%

p-Terphenyl-d14: 50-150%

Acceptable RPD limit: 35%

ESN NORTHWEST CHEMISTRY LABORATORY

Tel: (425) 957-9872, Fax: (425) 957-9904

Client: Washington Department of Fish and Wildlife
 Client Job Name: CCA Creek

Analytical Results

8270, µg/L	MTH BLK	LCS	# 1	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	
Date extracted	Reporting	09/17/08	09/17/08	09/17/08	09/17/08	
Date analyzed	Limits	09/17/08	09/17/08	09/17/08	09/17/08	
Pyridine	2.0	nd	nd			
Aniline	2.0	nd	nd			
Phenol	2.0	nd	nd	88%	93%	6%
2-Chlorophenol	2.0	nd	nd	109%	105%	4%
Bis (2-chloroethyl) ether	2.0	nd	nd			
1,3-Dichlorobenzene	2.0	nd	nd			
1,4-Dichlorobenzene	2.0	nd	92%	103%	102%	1%
1,2-Dichlorobenzene	2.0	nd	nd			
Benzyl alcohol	2.0	nd	nd			
2-Methylphenol (o-cresol)	2.0	nd	nd			
Bis (2-chloroisopropyl) ether	10.0	nd	nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd	nd			
Hexachloroethane	2.0	nd	nd			
N-Nitroso-di-n-propylamine	2.0	nd	nd	122%	122%	0%
Nitrobenzene	2.0	nd	nd			
Isophorone	2.0	nd	nd			
2-Nitrophenol	10.0	nd	nd			
4-Nitrophenol	10.0	nd	nd			
2,4-Dimethylphenol	2.0	nd	nd	100%	105%	5%
Bis (2-chloroethoxy) methane	2.0	nd	nd			
2,4-Dichlorophenol	10.0	nd	nd			
1,2,4-Trichlorobenzene	2.0	nd	nd	121%	119%	2%
Naphthalene	2.0	nd	nd			
4-Chloroaniline	10.0	nd	nd			
Hexachlorobutadiene	2.0	nd	131%			
4-Chloro-3-methylphenol	10.0	nd	nd	77%	82%	6%
2-Methylnaphthalene	2.0	nd	nd			
1-Methylnaphthalene	2.0	nd	nd			
Hexachlorocyclopentadiene	2.0	nd	nd			
2,4,6-Trichlorophenol	10.0	nd	nd			
2,4,5-Trichlorophenol	10.0	nd	nd			
2-Chloronaphthalene	2.0	nd	nd			
2-Nitroaniline	10.0	nd	nd			
1,4-Dinitrobenzene	10.0	nd	nd			
Dimethylphthalate	2.0	nd	nd			
Acenaphthylene	0.2	nd	nd			
1,3-Dinitrobenzene	10.0	nd	nd			
2,6-Dinitrotoluene	2.0	nd	nd			
1,2-Dinitrobenzene	2.0	nd	nd			
Acenaphthene	0.2	nd	121%	97%	99%	2%
3-Nitroaniline	10.0	nd	nd			
Dibenzofuran	2.0	nd	nd			
2,4-Dinitrotoluene	2.0	nd	nd	87%	87%	0%
2,3,4,6-Tetrachlorophenol	2.0	nd	nd			
2,3,5,6-Tetrachlorophenol	2.0	nd	nd			
2,4-Dinitrophenol	10.0	nd	nd			
Fluorene	0.2	nd	nd			

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Client: ESN NORTHWEST
Address: 1210 EASTSIDE STREET SE
OLYMPIA, WA 98501
Attn: STEPHEN J LOAGUE

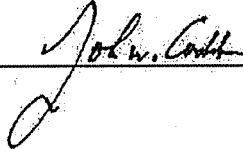
Batch #: 080930054
Project Name: WA DEPT FISH +
WILDLIFE STREAM
REHAB

Analytical Results Report

Sample Number	080930054-001	Sampling Date	9/24/2008	Date/Time Received	9/30/2008 10:30 AM
Client Sample ID	ROTENONE	Sampling Time	1:00 PM		
Matrix	Water				
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Rotenone	5.18	ug/L	5	10/6/2008	TGT	EPA 8321A	

Authorized Signature



MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

ESN NORTHWEST CHEMISTRY LABORATORY

Washington Department of Fish & Wildlife
CCA CREEK REHAB PROJECT
Pend Oreille County, Washington

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 (360) 459-3432 Fax
lab@esnnw.com

Analytical Results

8260B, µg/L (Water)	Reporting	MB	LCS	LCSD	CCA CREEK
Date analyzed	Limits	03/12/09	03/12/09	03/12/09	03/13/09
Dichlorodifluoromethane	1.0	nd			nd
Chloromethane	1.0	nd			nd
Vinyl chloride	0.2	nd			nd
Bromomethane	1.0	nd			nd
Chloroethane	1.0	nd			nd
Trichlorofluoromethane	1.0	nd			nd
Acetone	10.0	nd			nd
1,1-Dichloroethene	1.0	nd	112%	123%	nd
Methylene chloride	1.0	nd			nd
Methyl-t-butyl ether (MTBE)	1.0	nd			nd
trans-1,2-Dichloroethene	1.0	nd			nd
1,1-Dichloroethane	1.0	nd			nd
2-Butanone (MEK)	10.0	nd			nd
cis-1,2-Dichloroethene	1.0	nd			nd
2,2-Dichloropropane	1.0	nd			nd
Chloroform	1.0	nd			nd
Bromochloromethane	1.0	nd			nd
1,1,1-Trichloroethane	1.0	nd			nd
1,2-Dichloroethane (EDC)	1.0	nd			nd
1,1-Dichloropropene	1.0	nd			nd
Carbon tetrachloride	1.0	nd			nd
Benzene	1.0	nd	94%	106%	nd
Trichloroethene (TCE)	1.0	nd	82%	94%	nd
1,2-Dichloropropane	1.0	nd			nd
Dibromomethane	1.0	nd			nd
Bromodichloromethane	1.0	nd			nd
4-Methyl-2-pentanone (MIBK)	1.0	nd			nd
cis-1,3-Dichloropropene	1.0	nd			nd
Toluene	1.0	nd	101%	111%	nd
trans-1,3-Dichloropropene	1.0	nd			nd
1,1,2-Trichloroethane	1.0	nd			nd
2-Hexanone	1.0	nd			nd
1,3-Dichloropropane	1.0	nd			nd
Dibromochloromethane	1.0	nd			nd
Tetrachloroethene (PCE)	1.0	nd			nd
1,2-Dibromoethane (EDB)	1.0	nd			nd
Chlorobenzene	1.0	nd	98%	110%	nd
1,1,1,2-Tetrachloroethane	1.0	nd			nd
Ethylbenzene	1.0	nd			nd
Xylenes	3.0	nd			nd
Styrene	1.0	nd			nd
Bromoform	1.0	nd			nd
1,1,2,2-Tetrachloroethane	1.0	nd			nd
Isopropylbenzene	1.0	nd			nd
1,2,3-Trichloropropane	1.0	nd			nd
Bromobenzene	1.0	nd			nd
n-Propylbenzene	1.0	nd			nd
2-Chlorotoluene	1.0	nd			nd
4-Chlorotoluene	1.0	nd			nd
1,3,5-Trimethylbenzene	1.0	nd			nd
tert-Butylbenzene	1.0	nd			nd
1,2,4-Trimethylbenzene	1.0	nd			nd

ESN NORTHWEST CHEMISTRY LABORATORY

Washington Department of Fish & Wildlife
CCA CREEK REHAB PROJECT
Pend Oreille County, Washington

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 (360) 459-3432 Fax
lab@esnnw.com

Analytical Results

8260B, µg/L (Water)	Reporting	MB	LCS	LCSD	CCA CREEK
Date analyzed	Limits	03/12/09	03/12/09	03/12/09	03/13/09
sec-Butylbenzene	1.0	nd			nd
1,3-Dichlorobenzene	1.0	nd			nd
1,4-Dichlorobenzene	1.0	nd			nd
Isopropyltoluene	1.0	nd			nd
1,2-Dichlorobenzene	1.0	nd			nd
n-Butylbenzene	1.0	nd			nd
1,2-Dibromo-3-Chloropropane	1.0	nd			nd
1,2,4-Trichlorobenzene	1.0	nd			nd
Naphthalene	1.0	nd			nd
Hexachloro-1,3-butadiene	1.0	nd			nd
1,2,3-Trichlorobenzene	1.0	nd			nd

Surrogate recoveries

Dibromofluoromethane	109%	104%	104%	104%
Toluene-d8	114%	108%	106%	109%
4-Bromofluorobenzene	114%	107%	104%	105%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits: 65% TO 135%

Acceptable RPD limit: 35%

ESN NORTHWEST CHEMISTRY LABORATORY

Washington Department of Fish & Wildlife
CCA CREEK REHAB PROJECT
Pend Oreille County, Washington

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 (360) 459-3432 Fax
lab@esnnw.com

Analytical Results

8270, µg/L	MTH BLK	LCS	CCA Creek	MS	MSD	RPD	
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	03/13/09	03/13/09	03/13/09	03/13/09	03/13/09	
Date analyzed	Limits	03/13/09	03/13/09	03/13/09	03/13/09	03/13/09	
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	90%	104%	14%
2-Chlorophenol	2.0	nd		nd	117%	131%	11%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	128%	nd	97%	121%	22%
1,2-Dichlorobenzene	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexachloroethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	106%	125%	16%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd			
2,4-Dimethylphenol	2.0	nd		nd			
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	110%	103%	7%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	118%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	79%	86%	8%
2-Methylnaphthalene	2.0	nd		nd			
1-Methylnaphthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinitrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	126%	nd	98%	99%	1%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd	94%	104%	10%
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	113%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			

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Analytical Results

8270, µg/L	MTH BLK		LCS CCA Creek		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	03/13/09	03/13/09	03/13/09	03/13/09	03/13/09	
Date analyzed	Limits	03/13/09	03/13/09	03/13/09	03/13/09	03/13/09	
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	124%	nd			
Pyrene	0.2	nd		nd	121%	114%	6%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd		nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	83%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			
1-Methyl-2-Pyrrolidone	2.0	nd		nd			
Surrogate recoveries							
2-Fluorophenol		84%	122%	M	104%	115%	
Phenol-d6		74%	115%	M	97%	102%	
Nitrobenzene-d5		105%	127%	98%	96%	100%	
2-Fluorobiphenyl		89%	131%	89%	95%	102%	
2,4,6-Tribromophenol		67%	95%	M	75%	91%	
4-Terphenyl-d14		85%	128%	73%	78%	85%	

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %
Phenol - d5: 10-135 %
2,4,6- tribromophenol: 29-159%
Nitrobenzene - d5: 20-120 %
2-Fluorobiphenyl: 50-150%
p-Terphenyl-d14: 50-150%
Acceptable RPD limit: 35%

POST-REHABILITATION REPORT

North Potholes (Westlake Ponds)

WATER: North Potholes Ponds (Upper Crab Creek Arm)

LOCATION: Grant Co.; Section 31, T18N, R27E and Section 31, T19N, R28E; consisting of ponds in the northern portion of Potholes Reservoir.

DATE(S) TREATED: October 6, 2008

PURPOSE: Eliminate fish and bullfrog larvae from selected ponds in the Northern Leopard Frog Management Area within the Potholes Wildlife Area, and to enhance conditions for leopard frogs.

LISENCED APPLICATOR: Jeffrey W. Korth, WA Dept Fish and Wildlife (DFW), District 5 Fisheries Biologist, Pesticide License # 39429.

LAKE DESCRIPTION: At the time of treatment, the treatment area (TA) contained 35 small ponds; water level was at least 7 ft below high water marks:

Surface acres: 46.7

Depth: average 2 ft; maximum 8.5 ft

Volume: ~ 105.6 acre-feet

Weight of Water: 287,227,945 lbs

Connectivity: subterranean flows; no surface inlets or outlets. A series of small dikes separate the surface water of ponds in the TA from the main body of Potholes Reservoir. 35 separate ponds were treated.

TREATMENT DESCRIPTION:

Toxicant/methods used: Rotenone; Liquid CFT Legumine EPA Reg # 75338-2

140.8 gal. liquid formulation, 5% equivalent

Total Concentration Applied: 4.0 ppm

All liquid sprayed by helicopter

Detoxification Procedures: None.

PHYSICAL CHARACTERISTICS OF THE LAKE/WATER DURING TREATMENT:

Weather - Sunny, 2-5 mph easterly wind, air temp = 47-66F, avg. 56

Pre-treatment water quality parameters – Data was collected from 1 representative pond. Due to shallowness of waters, only a surface water sample was collected.

Pond ID	Date	pH	temp
B6a	10/04/08	7.68	18.9 C

SPECIES ERADICATED IN ORDER OF RELATIVE ABUNDANCE:

- 1) Carp (hundreds, yearling to large, old adults);
- 2) Bullfrogs (hundreds, all tadpoles 1-2 yr old); and

PRE- AND POST- TREATMENT MONITORING (all monitoring conducted as outlined in DFW's NPDES permit WA0041009):

Impact to non-targeted organisms – Zooplankton were sampled for diversity and abundance just previous to treatment, six months post treatment, and will again be sampled 12 months post treatment. Samples were taken from pond B6a. Samples are currently being processed, and the results will be available by separate report.

Liquid rotenone formulation longevity – Water samples were taken at 24 hours and four weeks post treatment to check for residues related to the carriers present in the liquid formulation of rotenone. Water samples were taken from the large pond SE of the DNR crop circle (pond B6a). Samples were sent to an accredited lab for analyses per EPA methods. All 23 volatile and semi-volatile organic compounds possibly present in liquid rotenone formulations, including benzene, toluene, phenol, xylene, acetone, acenaphthalene, fluorine, and derivatives of these compounds, were below detection limits in the 24-hour and four-week post-treatment samples.

Period of Toxicity – The bioassay with rainbow trout in a live-box was conducted from 11:00 am November 10th to 1:00 pm November 14th. Twelve fingerling (~2") rainbow trout were placed in a live-box in Pond B4a. Pond B4a was selected because Pond B6a had nearly dried up and no suitable place existed to perform the bioassay. On the 14th of November, 9 fish were alive and 3 had perished.

DESCRIPTION OF TREATMENT AND OTHER COMMENTS:

The fall 2008 treatment of the North Potholes Westlake Ponds was accomplished entirely with liquid rotenone. This "drainage" consists of the upper reaches of the Crab Creek Arm of Potholes Reservoir, which was at its lowest annual elevation at the time of treatment. Much of the area inundated earlier in the year was dry, and most ponds were quite small and shallow. A helicopter was used to spray 142 gallons of liquid rotenone over all open water in the TA on the day of treatment.

Beginning approx. 2 hours post-application, all ponds in the TA were surveyed by 4 people. The survey was completed in approx. 3 hours. Dead and dying carp were seen in most treated ponds. No non-target animals were observed to be killed or affected, including Northern Leopard Frogs and other amphibians.

Cost: About 18 man-days (man-day = 8 hrs) were required to complete the rehabilitation of the Westlake Ponds, from pre-rehabilitation proposals to post-treatment reports (not including Fish Program planning, meetings, equipment procurement, etc common to all rehabilitations done this FY). Treatment required a crew of 6 people for most of one day. Total cost of the project (rotenone, helicopter, labor, travel, and expendable equipment) was approximately \$24,000, including ~\$8,000 for rotenone (liquid @ \$55/gal) and ~\$7,000 for the helicopter application.

The TA will continue to be managed as fish-free to enhance conditions for leopard frogs.

Richard Finger, Biologist
WDFW Region 2 Wildlife Program

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Moses Lake, Washington

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Analytical Results

8260, µg/L (Water)		MTH BLK	LCS	Potholes	MS	MSD	RPD
Reporting							
Date analyzed	Limits	10/15/08	10/15/08	10/15/08	10/15/08	10/15/08	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
1,1-Dichloroethene	1.0	nd	78%	nd	89%	78%	13%
Methylene chloride	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	93%	nd	100%	90%	11%
Trichloroethene	1.0	nd	92%	nd	104%	91%	13%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	86%	nd	102%	83%	21%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene	1.0	nd		nd			
1,2-Dibromoethane (EDB)	1.0	nd		nd			
Chlorobenzene	1.0	nd	96%	nd	106%	89%	17%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	1.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			
Surrogate recoveries							
Dibromofluoromethane		92%	90%	93%	92%	94%	
Toluene-d8		97%	99%	96%	101%	98%	
4-Bromofluorobenzene		102%	104%	107%	117%	105%	

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

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NLF ENHANCEMENT PROJECT
Moses Lake, Washington

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lab@esnsw.com

Analytical Results

8270, µg/L	MTH BLK	LCS	Potholes	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/13/08	10/13/08	10/13/08	10/13/08	
Date analyzed	Limits	10/13/08	10/13/08	10/13/08	10/13/08	
Pyridine	2.0	nd		nd		
Aniline	2.0	nd		nd		
Phenol	2.0	nd		nd	81%	5%
2-Chlorophenol	2.0	nd		nd	106%	4%
Bis (2-chloroethyl) ether	2.0	nd		nd		
1,3-Dichlorobenzene	2.0	nd		nd		
1,4-Dichlorobenzene	2.0	nd	124%	nd	102%	2%
1,2-Dichlorobenzene	2.0	nd		nd		
N-methylpyrrolidone	2.0	nd		nd		
Benzyl alcohol	2.0	nd		nd		
2-Methylphenol (o-cresol)	2.0	nd		nd		
Bis (2-chloroisopropyl) ether	10.0	nd		nd		
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd		
Hexachloroethane	2.0	nd		nd		
N-Nitroso-di-n-propylamine	2.0	nd		nd	108%	1%
Nitrobenzene	2.0	nd		nd		
Isophorone	2.0	nd		nd		
2-Nitrophenol	10.0	nd		nd		
4-Nitrophenol	10.0	nd		nd		
2,4-Dimethylphenol	2.0	nd		nd	82%	2%
Bis (2-chloroethoxy) methane	2.0	nd		nd		
2,4-Dichlorophenol	10.0	nd		nd		
1,2,4-Trichlorobenzene	2.0	nd		nd	124%	3%
Naphthalene	2.0	nd		nd		
4-Chloroaniline	10.0	nd		nd		
Hexachlorobutadiene	2.0	nd	126%	nd		
4-Chloro-3-methylphenol	10.0	nd		nd	66%	0%
2-Methylnaphthalene	2.0	nd		nd		
1-Methylnaphthalene	2.0	nd		nd		
Hexachlorocyclopentadiene	2.0	nd		nd		
2,4,6-Trichlorophenol	10.0	nd		nd		
2,4,5-Trichlorophenol	10.0	nd		nd		
2-Chloronaphthalene	2.0	nd		nd		
2-Nitroaniline	10.0	nd		nd		
1,4-Dinitrobenzene	10.0	nd		nd		
Dimethylphthalate	2.0	nd		nd		
Acenaphthylene	0.2	nd		nd		
1,3-Dinitrobenzene	10.0	nd		nd		
2,6-Dinitrotoluene	2.0	nd		nd		
1,2-Dinitrobenzene	2.0	nd		nd		
Acenaphthene	0.2	nd	131%	nd	115%	2%
3-Nitroaniline	10.0	nd		nd		
Dibenzofuran	2.0	nd		nd		
2,4-Dinitrotoluene	2.0	nd		nd	94%	4%
2,3,4,6-Tetrachlorophenol	2.0	nd		nd		
2,3,5,6-Tetrachlorophenol	2.0	nd		nd		
2,4-Dinitrophenol	10.0	nd		nd		
Fluorene	0.2	nd		nd		

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Analytical Results

8270, µg/L		MTH BLK	LCS	Potholes	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08	
Date analyzed	Limits	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08	
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	83%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	126%	nd			
Pyrene	0.2	nd		nd	78%	79%	1%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	96%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	80%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			
Surrogate recoveries							
2-Fluorophenol		80%	115%	122%	84%	83%	
Phenol-d6		96%	105%	129%	88%	86%	
Nitrobenzene-d5		118%	124%	99%	86%	83%	
2-Fluorobiphenyl		91%	134%	78%	89%	87%	
2,4,6-Tribromophenol		69%	91%	63%	50%	52%	
4-Terphenyl-d14		79%	130%	64%	75%	73%	

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %

Phenol - d5: 10-135 %

2,4,6-tribromophenol: 29-159%

Nitrobenzene - d5: 20-120 %

2-Fluorobiphenyl: 50-150%

p-Terphenyl-d14: 50-150%

Acceptable RPD limit: 35%

CHAIN-OF-CUSTODY RECORD

CLIENT: WA Dept of Trans + Commerce DATE: 10/24/08 PAGE 1 OF 1
 ADDRESS: 13300 1st Ave SE ALU. 1 PMNTA WA PROJECT NAME: NLE ENLIGHTENMENT
 PHONE: (509) 754-4624 FAX: (509) 757-5257 LOCATION: Port of Everett, WA
 CLIENT PROJECT #: _____ PROJECT MANAGER: Bill Finkbein COLLECTOR: John Allen DATE OF COLLECTION: 10/24/08

Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES										NOTES	Total Number of Containers	Laboratory Note Number
					VOA 8021B	VOA 8021B BTEX ONLY	TPH - HCHO	TPH 8015 (aqueous)	TPH 8015 (dioxin)	PAH 8010 (dioxin)	PCBS 8022	PCBS 8022	Asbestos 8021	RCRA 8	RCRA 5		
1.	✓	12:20		VIAL													
2.	✓	12:20		VIAL													
3.	✓	12:20		VIAL													
4.	✓	12:23		PINT													
5.	✓	12:23		PINT													
6.																	
7.																	
8.																	
9.																	
10.																	
11.																	
12.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
13.																	
14.																	
15.																	
16.																	
17.																	
18.																	

RELINQUISHED BY (Signature) _____ DATE/TIME _____ RECEIVED BY (Signature) _____ DATE/TIME _____
 10/24/08 1500 7M0800 10/24/08
 RELINQUISHED BY (Signature) _____ DATE/TIME _____ RECEIVED BY (Signature) _____ DATE/TIME _____
 SAMPLE DISPOSAL INSTRUCTIONS
☐ ESN DISPOSAL @ \$2.00 each ☐ Return ☐ Pickup
 LABORATORY NOTES:
 18260, 18270
 1 Rotenone
 Turn Around Time: 24 HR 48 HR 75 DAY

ESN NORTHWEST CHEMISTRY LABORATORY

WA Dept. of Fish & Wildlife
WESTLAKE - H. LEOPARD FROG PROJECT
Washington

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lab@esnnw.com

Analytical Results

8260, µg/L (Water)	Reporting Limits	MTH BLK	LCS	#1	MS	MSD	RPD
Date analyzed	11/19/08	11/19/08	11/19/08	11/19/08	11/19/08	11/19/08	11/19/08
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
1,1-Dichloroethene	1.0	nd	63%	nd	87%	65%	29%
Methylene chloride	1.0	nd		nd			
MTBE	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	102%	nd	121%	85%	35%
Trichloroethene	1.0	nd	108%	nd	128%	86%	39%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	101%	nd	127%	84%	41%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene	1.0	nd		nd			
1,2-Dibromoethane (EDB)	1.0	nd		nd			
Chlorobenzene	1.0	nd	114%	nd	138%	92%	40%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	3.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

Surrogate recoveries

Dibromofluoromethane	108%	107%	108%	111%	126%
Toluene-d8	121%	122%	116%	120%	124%
4-Bromofluorobenzene	124%	120%	127%	121%	121%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel: (425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S81117.3
Client: WA. Dept. of Fish & Wildlife
Client Job Name: Westlake

Analytical Results

8270, µg/L	MTH BLK		LCS	#1	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	11/18/08	11/18/08	11/18/08	11/18/08	11/18/08	
Date analyzed	Limits	11/18/08	11/18/08	11/18/08	11/18/08	11/18/08	
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	125%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	114%	nd			
Pyrene	0.2	nd		nd	69%	71%	3%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	86%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	71%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

Surrogate recoveries

2-Fluorophenol	94%	108%	119%	86%	86%
Phenol-d6	93%	116%	125%	93%	92%
Nitrobenzene-d5	109%	134%	115%	91%	89%
2-Fluorobiphenyl	87%	126%	107%	84%	84%
2,4,6-Tribromophenol	46%	41%	48%	50%	51%
4-Terphenyl-d14	73%	107%	81%	63%	61%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %
Phenol - d5: 10-135 %
2,4,6-tribromophenol: 29-159%
Nitrobenzene - d5: 20-120 %
2-Fluorobiphenyl: 50-150%
p-Terphenyl-d14: 50-150%
Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel: (425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S81117.3
Client: WA. Dept. of Fish & Wildlife
Client Job Name: Westlake

Analytical Results

8270, µg/L	MTH BLK	LCS	#1	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	
Date extracted	Reporting	11/18/08	11/18/08	11/18/08	11/18/08	
Date analyzed	Limits	11/18/08	11/18/08	11/18/08	11/18/08	
Pyridine	2.0	nd	nd			
Aniline	2.0	nd	nd			
Phenol	2.0	nd	nd	87%	92%	6%
2-Chlorophenol	2.0	nd	nd	107%	113%	5%
Bis (2-chloroethyl) ether	2.0	nd	nd			
1,3-Dichlorobenzene	2.0	nd	nd			
1,4-Dichlorobenzene	2.0	nd	119%	102%	101%	1%
1,2-Dichlorobenzene	2.0	nd	nd			
N-methylpyrrolidone	2.0	nd	nd			
Benzyl alcohol	2.0	nd	nd			
2-Methylphenol (o-cresol)	2.0	nd	nd			
Bis (2-chloroisopropyl) ether	10.0	nd	nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd	nd			
Hexachlorethane	2.0	nd	nd			
N-Nitroso-di-n-propylamine	2.0	nd	nd	116%	117%	1%
Nitrobenzene	2.0	nd	nd			
Isophorone	2.0	nd	nd			
2-Nitrophenol	10.0	nd	nd			
4-Nitrophenol	10.0	nd	nd			
2,4-Dimethylphenol	2.0	nd	nd	90%	94%	4%
Bis (2-chloroethoxy) methane	2.0	nd	nd			
2,4-Dichlorophenol	10.0	nd	nd			
1,2,4-Trichlorobenzene	2.0	nd	nd	117%	118%	1%
Naphthalene	2.0	nd	nd			
4-Chloroaniline	10.0	nd	nd			
Hexachlorobutadiene	2.0	nd	131%			
4-Chloro-3-methylphenol	10.0	nd	nd	70%	73%	4%
2-Methylnaphthalene	2.0	nd	nd			
1-Methylnaphthalene	2.0	nd	nd			
Hexachlorocyclopentadiene	2.0	nd	nd			
2,4,6-Trichlorophenol	10.0	nd	nd			
2,4,5-Trichlorophenol	10.0	nd	nd			
2-Chloronaphthalene	2.0	nd	nd			
2-Nitroaniline	10.0	nd	nd			
1,4-Dinitrobenzene	10.0	nd	nd			
Dimethylphthalate	2.0	nd	nd			
Acenaphthylene	0.2	nd	nd			
1,3-Dinitrobenzene	10.0	nd	nd			
2,6-Dinitrotoluene	2.0	nd	nd			
1,2-Dinitrobenzene	2.0	nd	nd			
Acenaphthene	0.2	nd	131%	99%	98%	1%
3-Nitroaniline	10.0	nd	nd			
Dibenzofuran	2.0	nd	nd			
2,4-Dinitrotoluene	2.0	nd	nd	82%	80%	2%
2,3,4,6-Tetrachlorophenol	2.0	nd	nd			
2,3,5,6-Tetrachlorophenol	2.0	nd	nd			
2,4-Dinitrophenol	10.0	nd	nd			
Fluorene	0.2	nd	nd			

5 DAY

POST-REHABILITATION REPORT

North Potholes (Westlake Ponds)

WATER: TD2 Ponds (between Desert and Harris Lakes)

LOCATION: Grant Co.; Sections 35 & 36, T18N, R27E; consisting of ponds between Desert and Harris Lakes.

DATE(S) TREATED: October 6, 2008

PURPOSE: Eliminate fish from selected ponds to enhance conditions for breeding waterfowl.

LISENCED APPLICATOR: Jeffrey W. Korth, WA Dept Fish and Wildlife (DFW), District 5 Fisheries Biologist, Pesticide License # 39429.

LAKE DESCRIPTION: At the time of treatment, the treatment area (TA) contained 12 small ponds; water level was about 1 ft below high water mark:

Surface acres: 61.4

Depth: average 1.5 ft; maximum 3.3 ft

Volume: ~104 acre-feet

Weight of Water: 282,876,007 lbs

Connectivity: subterranean flows; no surface inlets or outlets. 12 separate ponds were treated.

TREATMENT DESCRIPTION:

Toxicant/methods used: Rotenone; Liquid CFT Legumine EPA Reg # 75338-2

62 gal. liquid formulation, 5% equivalent

Total Concentration Applied: 3.0 ppm

All liquid sprayed by helicopter

Detoxification Procedures: None.

PHYSICAL CHARACTERISTICS OF THE LAKE/WATER DURING TREATMENT:

Weather - Sunny, 2-5 mph easterly wind, air temp = 47-66F, avg. 56

Pre-treatment water quality parameters – Data was collected from 1 representative pond. Due to shallowness of waters, only a surface water sample was collected.

Pond ID	Date	pH	temp
Pond 8	10/4/08	7.70	18C

SPECIES ERADICATED IN ORDER OF RELATIVE ABUNDANCE:

- 1) Pumpkin seed (100's)

PRE- AND POST- TREATMENT MONITORING (all monitoring conducted as outlined in DFW's NPDES permit WA0041009):

Impact to non-targeted organisms – Zooplankton were sampled for diversity and abundance just prior to treatment, six months post treatment, and will again be sampled 12 months post treatment. Samples were taken from pond 8. Samples are currently being processed, and the results will be available by separate report.

Liquid rotenone formulation longevity – Water samples were taken at 24 hours and four weeks post treatment to check for residues related to the carriers present in the liquid formulation of rotenone. Water samples were taken from a moderate sized pond centrally located within the TA (pond 8). Samples were sent to an accredited lab for analyses per EPA methods. All 23 volatile and semi-volatile organic compounds possibly present in liquid rotenone formulations, including benzene, toluene, phenol, xylene, acetone, acenaphthalene, fluorine, and derivatives of these compounds, were below detection limits in the 24-hour and four-week post-treatment samples.

Period of Toxicity – The bioassay with rainbow trout in a live-box was conducted from November 21 through November 25. Fourteen fingerling (~2") rainbow trout were placed in a live-box in Pond 8 at 9:30 am November 21st and all fish were alive at 1:45 pm November 25th. Given the relatively warm water temperature, shallow water, and high organic content of the ponds, rotenone longevity was probably less than one week, and certainly less than four weeks. Fish stocking was not planned for these waters.

DESCRIPTION OF TREATMENT AND OTHER COMMENTS:

The fall 2008 treatment of TD2 was accomplished entirely with liquid rotenone. The wetland area consists of shallow ponds associated with the Winchester Wasteway between Dodson Rd and Potholes Reservoir between Desert and Harris Lakes. These ponds are typically at their lowest during fall, when treatment occurred. A helicopter was used to spray 123 gallons of liquid rotenone over all open water in the TA on the day of treatment.

The TD2 project area was surveyed for fish presence on April 27 and May 22, 2007. 6 ponds were gill-netted. Fish were successfully netted from 50% of ponds sampled (pumpkinseed was the only fish species detected). One pond (Pond 2) netted 33 pumpkinseed, the other 2 ponds with fish had <10 pumpkinseed each. Because pumpkinseed are not effectively caught with gill nets, it was assumed that all ponds had the potential to contain pumpkinseed.

Ponds were not sampled post-treatment but it is likely that 100's of pumpkinseeds were killed. Pumpkinseed are quickly consumed by predators and because the treatment occurred in the late afternoon, it was not possible to survey prior to nightfall. It was assumed that most fish were removed overnight and thus no formal survey was planned. However, during water quality sampling 24 hours later, no fish were observed around the SE edge of pond 8. Casual observations at ponds 4 and pond 6 also revealed no dead fish.

Cost: About 16 man-days (man-day = 8 hrs) were required to complete the rehabilitation of the Westlake Ponds, from pre-rehabilitation proposals to post-treatment reports (not including Fish Program planning, meetings, equipment procurement, etc common to all rehabilitations done this FY). Treatment alone required a crew of 4 people for most of one day. Total cost of the project (rotenone, helicopter, labor, travel, expendable equipment) was approximately \$10,000, including \$6,750 for rotenone (liquid @ \$55/gal) and \$1,500 for the helicopter application.

The TA will continue to be managed as fish-free to enhance conditions for breeding waterfowl.

Rich Finger, Biologist
WDFW Region 2 Wildlife Program

ESN NORTHWEST CHEMISTRY LABORATORY

WA Dept. of Fish & Wildlife
TD2 REHAB PROJECT
Washington

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 (360) 459-3432 Fax
lab@esnnw.com

Analytical Results

8260, µg/L (Water)	Reporting	MTH BLK	LCS	#1	MS	MSD	RPD
Date analyzed	Limits	11/19/08	11/19/08		11/19/08	11/19/08	11/19/08
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
1,1-Dichloroethene	1.0	nd	63%	nd	87%	65%	29%
Methylene chloride	1.0	nd		nd			
MTBE	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	102%	nd	121%	85%	35%
Trichloroethene	1.0	nd	108%	nd	128%	86%	39%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	101%	nd	127%	84%	41%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene	1.0	nd		nd			
1,2-Dibromoethane (EDB)	1.0	nd		nd			
Chlorobenzene	1.0	nd	114%	nd	138%	92%	40%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	3.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

Surrogate recoveries

Dibromofluoromethane	108%	107%	108%	111%	126%
Toluene-d8	121%	122%	116%	120%	124%
4-Bromofluorobenzene	124%	120%	127%	121%	121%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S81117.4
Client: WA. Dept of Fish & Wildlife
Client Job Name: TD2 Rehab

Analytical Results

8270, µg/L	MTH BLK	LCS	#1	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	
Date extracted	Reporting	11/18/08	11/18/08	11/18/08	11/18/08	11/18/08
Date analyzed	Limits	11/18/08	11/18/08	11/18/08	11/18/08	11/18/08
4-Chlorophenylphenylether	2.0	nd	nd			
Diethylphthalate	2.0	nd	nd			
4-Nitroaniline	10.0	nd	nd			
4,6-Dinitro-2-methylphenol	10.0	nd	nd			
N-nitrosodiphenylamine	2.0	nd	125%	nd		
Azobenzene	2.0	nd	nd			
4-Bromophenylphenylether	2.0	nd	nd			
Hexachlorobenzene	2.0	nd	nd			
Pentachlorophenol	10.0	nd	nd			
Phenanthrene	0.2	nd	nd			
Anthracene	0.2	nd	nd			
Carbazole	2.0	nd	nd			
Di-n-butylphthalate	2.0	nd	nd			
Fluoranthene	0.2	nd	114%	nd		
Pyrene	0.2	nd	nd	69%	71%	3%
Butylbenzylphthalate	2.0	nd	nd			
Bis(2-ethylhexyl) adipate	2.0	nd	nd			
Benzo(a)anthracene	0.2	nd	nd			
Chrysene	0.2	nd	nd			
Bis (2-ethylhexyl) phthalate	2.0	nd	nd			
Di-n-octyl phthalate	2.0	nd	86%	nd		
Benzo(b)fluoranthene	0.2	nd	nd			
Benzo(k)fluoranthene	0.2	nd	nd			
Benzo(a)pyrene	0.2	nd	71%	nd		
Dibenzo(a,h)anthracene	0.2	nd	nd			
Benzo(ghi)perylene	0.2	nd	nd			
Indeno(1,2,3-cd)pyrene	0.2	nd	nd			

Surrogate recoveries

2-Fluorophenol	94%	108%	128%	86%	86%
Phenol-d6	93%	116%	134%	93%	92%
Nitrobenzene-d5	109%	134%	111%	91%	89%
2-Fluorobiphenyl	87%	126%	110%	84%	84%
2,4,6-Tribromophenol	46%	41%	52%	50%	51%
4-Terphenyl-d14	73%	107%	86%	63%	61%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %

Phenol - d5: 10-135 %

2,4,6- tribromophenol: 29-159%

Nitrobenzene - d5: 20-120 %

2-Fluorobiphenyl: 50-150%

p-Terphenyl-d14: 50-150%

Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel: (425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S81117.4
Client: WA. Dept of Fish & Wildlife
Client Job Name: TD2 Rehab

Analytical Results

8270, µg/L	MTH BLK	LCS	#1	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water
Date extracted	Reporting	11/18/08	11/18/08	11/18/08	11/18/08	11/18/08
Date analyzed	Limits	11/18/08	11/18/08	11/18/08	11/18/08	11/18/08
Pyridine	2.0	nd	nd			
Aniline	2.0	nd	nd			
Phenol	2.0	nd	nd	87%	92%	6%
2-Chlorophenol	2.0	nd	nd	107%	113%	5%
Bis (2-chloroethyl) ether	2.0	nd	nd			
1,3-Dichlorobenzene	2.0	nd	nd			
1,4-Dichlorobenzene	2.0	nd	119%	102%	101%	1%
1,2-Dichlorobenzene	2.0	nd	nd			
N-methylpyrrolidone	2.0	nd	nd			
Benzyl alcohol	2.0	nd	nd			
2-Methylphenol (o-cresol)	2.0	nd	nd			
Bis (2-chloroisopropyl) ether	10.0	nd	nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd	nd			
Hexachloroethane	2.0	nd	nd			
N-Nitroso-di-n-propylamine	2.0	nd	nd	116%	117%	1%
Nitrobenzene	2.0	nd	nd			
Isophorone	2.0	nd	nd			
2-Nitrophenol	10.0	nd	nd			
4-Nitrophenol	10.0	nd	nd			
2,4-Dimethylphenol	2.0	nd	nd	90%	94%	4%
Bis (2-chloroethoxy) methane	2.0	nd	nd			
2,4-Dichlorophenol	10.0	nd	nd			
1,2,4-Trichlorobenzene	2.0	nd	nd	117%	118%	1%
Naphthalene	2.0	nd	nd			
4-Chloroaniline	10.0	nd	nd			
Hexachlorobutadiene	2.0	nd	131%			
4-Chloro-3-methylphenol	10.0	nd	nd	70%	73%	4%
2-Methylnaphthalene	2.0	nd	nd			
1-Methylnaphthalene	2.0	nd	nd			
Hexachlorocyclopentadiene	2.0	nd	nd			
2,4,6-Trichlorophenol	10.0	nd	nd			
2,4,5-Trichlorophenol	10.0	nd	nd			
2-Chloronaphthalene	2.0	nd	nd			
2-Nitroaniline	10.0	nd	nd			
1,4-Dinitrobenzene	10.0	nd	nd			
Dimethylphthalate	2.0	nd	nd			
Acenaphthylene	0.2	nd	nd			
1,3-Dinitrobenzene	10.0	nd	nd			
2,6-Dinitrotoluene	2.0	nd	nd			
1,2-Dinitrobenzene	2.0	nd	nd			
Acenaphthene	0.2	nd	131%	99%	98%	1%
3-Nitroaniline	10.0	nd	nd			
Dibenzofuran	2.0	nd	nd			
2,4-Dinitrotoluene	2.0	nd	nd	82%	80%	2%
2,3,4,6-Tetrachlorophenol	2.0	nd	nd			
2,3,5,6-Tetrachlorophenol	2.0	nd	nd			
2,4-Dinitrophenol	10.0	nd	nd			
Fluorene	0.2	nd	nd			

CHAIN-OF-CUSTODY RECORD

CLIENT: WDFW
 ADDRESS: 1550 Alder St NW, Ephrata, WA 98823
 PHONE: 509-754-4624 FAX: 509-754-5257
 CLIENT PROJECT #: _____ PROJECT MANAGER: Rich Finger

DATE: 11/12/08 PAGE 1 OF 1
 PROJECT NAME: TD 2 Rehab
 LOCATION: TD 2 Pond 8
 COLLECTOR: Rich Finger DATE OF COLLECTION: 11/12/08

Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES																	NOTES	Total Number of Containers	Laboratory Note Number			
					VOA 8021B	VOA 8021B BTX Only	VOA 8280	SEMI VOL 8270	TPH - HCID	TPH 8015 (gasoline)	TPH 8015 (diesel)	TPH 8015 (o & g)	PAH 8100	PAH 8270	PCBs 8082	Pesticides 8081	ASBESTOS-PLM	RCRA 8	MTCA 5	Pb							
1.	5	1:30pm		Pmt																							
2.				Pmt																							
3.				Vial																							
4.				Vial																							
5.	↑	↑		Vial																							
6.																											
7.																											
8.																											
9.																											
10.																											
11.																											
12.																											
13.																											
14.																											
15.																											
16.																											
17.																											
18.																											

RELINQUISHED BY (Signature) [Signature] DATE/TIME 11/13/08 10:00am
 RECEIVED BY (Signature) [Signature] DATE/TIME 10:00am 11/19

SAMPLE RECEIPT
 TOTAL NUMBER OF CONTAINERS
 CHAIN OF CUSTODY SEALS YINNA
 SEALS INTACT YINNA
 RECEIVED GOOD COND /COLD

REINQUISHED BY (Signature) _____ DATE/TIME _____
 RECEIVED BY (Signature) _____ DATE/TIME _____

SAMPLE DISPOSAL INSTRUCTIONS
☐ ESN DISPOSAL @ \$2.00 each ☐ Return ☐ Pickup

NOTES: _____

LABORATORY NOTES:
8860 and 8270 w/ Methyl pyrrolidone
 Turn Around Time: 24 HR 48 HR **5 DAY**

ESN NORTHWEST CHEMISTRY LABORATORY

WA Dept. of Fish & Wildlife
TD2 REHAB PROJECT

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 (360) 459-3432
lab@esnnw.com

Analytical Results

8260, µg/L (Water)	MTH.BLK	LCS	Pond 8	MS	MSD	RPD
Date analyzed	Limits	10/15/08	10/15/08	10/15/08	10/15/08	10/15/08
Dichlorodifluoromethane	1.0	nd		nd		
Chloromethane	1.0	nd		nd		
Vinyl chloride	0.2	nd		nd		
Bromomethane	1.0	nd		nd		
Chloroethane	1.0	nd		nd		
Trichlorofluoromethane	1.0	nd		nd		
1,1-Dichloroethene	1.0	nd	78%	nd	89%	78% 13%
Methylene chloride	1.0	nd		nd		
trans-1,2-Dichloroethene	1.0	nd		nd		
1,1-Dichloroethane	1.0	nd		nd		
cis-1,2-Dichloroethene	1.0	nd		nd		
2,2-Dichloropropane	1.0	nd		nd		
Chloroform	1.0	nd		nd		
Bromochloromethane	1.0	nd		nd		
1,1,1-Trichloroethane	1.0	nd		nd		
1,2-Dichloroethane	1.0	nd		nd		
1,1-Dichloropropene	1.0	nd		nd		
Carbon tetrachloride	1.0	nd		nd		
Benzene	1.0	nd	93%	nd	100%	90% 11%
Trichloroethene	1.0	nd	92%	nd	104%	91% 13%
1,2-Dichloropropane	1.0	nd		nd		
Dibromomethane	1.0	nd		nd		
Bromodichloromethane	1.0	nd		nd		
cis-1,3-Dichloropropene	1.0	nd		nd		
Toluene	1.0	nd	86%	nd	102%	83% 21%
trans-1,3-Dichloropropene	1.0	nd		nd		
1,1,2-Trichloroethane	1.0	nd		nd		
1,3-Dichloropropane	1.0	nd		nd		
Dibromochloromethane	1.0	nd		nd		
Tetrachloroethene	1.0	nd		nd		
1,2-Dibromoethane (EDB)	1.0	nd		nd		
Chlorobenzene	1.0	nd	96%	nd	106%	89% 17%
1,1,1,2-Tetrachloroethane	1.0	nd		nd		
Ethylbenzene	1.0	nd		nd		
Xylenes	1.0	nd		nd		
Styrene	1.0	nd		nd		
Bromoform	1.0	nd		nd		
1,1,2,2-Tetrachloroethane	1.0	nd		nd		
Isopropylbenzene	1.0	nd		nd		
1,2,3-Trichloropropane	1.0	nd		nd		
Bromobenzene	1.0	nd		nd		
n-Propylbenzene	1.0	nd		nd		
2-Chlorotoluene	1.0	nd		nd		
4-Chlorotoluene	1.0	nd		nd		
1,3,5-Trimethylbenzene	1.0	nd		nd		
tert-Butylbenzene	1.0	nd		nd		
1,2,4-Trimethylbenzene	1.0	nd		nd		
sec-Butylbenzene	1.0	nd		nd		
1,3-Dichlorobenzene	1.0	nd		nd		
1,4-Dichlorobenzene	1.0	nd		nd		
Isopropyltoluene	1.0	nd		nd		
1,2-Dichlorobenzene	1.0	nd		nd		
n-Butylbenzene	1.0	nd		nd		
1,2-Dibromo-3-Chloropropane	1.0	nd		nd		
1,2,4-Trichlorobenzene	1.0	nd		nd		
Naphthalene	1.0	nd		nd		
Hexachloro-1,3-butadiene	1.0	nd		nd		
1,2,3-Trichlorobenzene	1.0	nd		nd		
Surrogate recoveries						
Dibromofluoromethane		92%	90%	95%	92%	94%
Toluene-d8		97%	99%	96%	101%	98%
4-Bromofluorobenzene		102%	104%	102%	117%	105%

Data Qualifiers and Analytical Comments

nd = not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NORTHWEST CHEMISTRY LABORATORY

WA Dept. of Fish & Wildlife
TD2 REHAB PROJECT

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 (360) 459-3432 Fax
lab@esnnpw.com

Analytical Results

8270, µg/L	MTH BLK		LCS Pond 8		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08	
Date analyzed	Limits	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08	
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	81%	85%	5%
2-Chlorophenol	2.0	nd		nd	106%	110%	4%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	124%	nd	102%	100%	2%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresc	2.0	nd		nd			
Hexachloroethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	108%	109%	1%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd			
2,4-Dimethylphenol	2.0	nd		nd	82%	84%	2%
Bis (2-chloroethoxy) methan	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	124%	120%	3%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	126%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	66%	66%	0%
2-Methylnaphthalene	2.0	nd		nd			
1-Methylnaphthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinitrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	131%	nd	115%	117%	2%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd	94%	98%	4%
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			

ESN NORTHWEST CHEMISTRY LABORATORY

WA Dept. of Fish & Wildlife
TD2 REHAB PROJECT

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 (360) 459-3432 Fax
lab@esnww.com

Analytical Results

8270, µg/L	MTH BLK		LCS Pond 8		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08	
Date analyzed	Limits	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08	
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	83%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	126%	nd			
Pyrene	0.2	nd		nd	78%	79%	1%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	96%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	80%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			
Surrogate recoveries							
2-Fluorophenol		80%	115%	129%	84%	83%	
Phenol-d6		96%	105%	114%	88%	86%	
Nitrobenzene-d5		118%	124%	109%	86%	83%	
2-Fluorobiphenyl		91%	134%	115%	89%	87%	
2,4,6-Tribromophenol		69%	91%	64%	50%	52%	
4-Terphenyl-d14		79%	130%	102%	75%	73%	

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %

Phenol - d5: 10-135 %

2,4,6- tribromophenol: 29-159%

Nitrobenzene - d5: 20-120 %

2-Fluorobiphenyl: 50-150%

p-Terphenyl-d14: 50-150%

Acceptable RPD limit: 35%

CHAIN-OF-CUSTODY RECORD

CLIENT: WDFW DATE: 10/8/08 PAGE 1 OF 1

ADDRESS: 1550 Alder St NW, Ephrata WA 98823 PROJECT NAME: IDZ Rehab

PHONE: 509-754-4624 FAX: 509-754-5257 LOCATION: IDZ pond 8

CLIENT PROJECT #: _____ PROJECT MANAGER: _____ COLLECTOR: Rich Fonger DATE OF COLLECTION: 10/7/08

Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES	TPH VOL 8270	TPH VOL 8270 (seal)	TPH 8015 (seal)	TPH 8015 (seal)	TPH 8015 (seal)	TPH 8015 (seal)	PCBs 8082	Pesticides 8081	ASBESTOS-PLM	PCRA 8	PCRA 5	NOTES	Total Number of Containers	Laboratory Note Number
1. Pond 1	5	2:00pm	H ₂ O																
2. Pond 2	1	1																	
3. Pond 1	1	1																	
4. Pond 2	1	1																	
5. Pond 3	1	1																	
6.																			
7.																			
8.																			
9.																			
10.																			
11.																			
12.																			
13.																			
14.																			
15.																			
16.																			
17.																			
18.																			

RELINQUISHED BY (Signature) [Signature] DATE/TIME 10/8/08 12pm RECEIVED BY (Signature) [Signature] DATE/TIME 10/9/08

RELINQUISHED BY (Signature) [Signature] DATE/TIME 10/8/08 12pm RECEIVED BY (Signature) [Signature] DATE/TIME 10/9/08

SAMPLE DISPOSAL INSTRUCTIONS

☐ ESN DISPOSAL @ \$2.00 each ☐ Return ☐ Pickup

LABORATORY NOTES:
1-8270
1-8260
1-Rotenone

Turn Around Time: 24 HR 48 HR 5 DAY

POST-REHABILITATION REPORT

Water: Frater Lake

Location: Sec 3, T36N, R42E and Sec 34, T37N, R42E; 4.3 miles southwest of Tiger, Pend Oreille County, WA.

DATES TREATED: October 8, 2008

PURPOSE: Improve trout survival and growth through reduction of undesirable fish populations.

LISENCED APPLICATOR: Robert Jateff, Washington Department of Fish and Wildlife (WDFW), District 6 Fisheries Biologist, Pesticide License # 74965. Jon Anderson, WDFW, Native Resident Species Fisheries Manager, Pesticide License # 69176.

LAKE DESCRIPTION full pool and (at treatment, if different):

Full pool at treatment.

Surface acres: 15.0

Depth: average ~ 8 ft; maximum 15 ft

Volume: 90 acre-feet

Weight of Water: 244,800,000 lbs.

Connectivity: Inlets – Intermittent stream on northwest corner of lake. Outlet – Intermittent connection via unnamed channel to Leo Lake (and other Little Pend Oreille Chain lakes).

TREATMENT DESCRIPTION:

Toxicant used: Rotenone - Cube powdered Fish Toxicant EPA Reg # 6458-6; Liquid CFT Legumine EPA Reg # 75338-2

<u>Date</u>	<u>Actual Rotenone used</u>		<u>ppm (product)</u>
	<u>Powder</u> lbs @ conc.	<u>Liquid</u> gals @ 5%	
10/08/2008	715 @ 7.0%	5 (CFT)	4.0

Equivalent 1,001 @ 5.0%

All powder was slurried with lake water, and liquid was mixed with lake water and sprayed in shallow waters.

The lake was treated at a rotenone concentration of 4 ppm product (0.05 ppm actual rotenone).

Detoxification Procedures: treated waters naturally detoxified. No detoxification was necessary, as there was no surface water connection to the outlet stream.

SPECIES OF FISH ERADICATED IN ORDER OF RELATIVE ABUNDANCE:

Species, size; estimated abundance

Pumpkinseed sunfish 1-5"; thousands (maximum estimate = 7,000)
Tench 10-14"; hundreds (maximum estimate = 800)
Cutthroat trout 12-13"; tens (1 observed, maximum estimate = 10)

PHYSICAL CHARACTERISTICS OF THE LAKE DURING TREATMENT:

Pre-treatment water quality parameters – October 8, 2008.

Depth (m)	Water temp (°C)	D.O. (mg/L)	pH	Conductivity (µS/cm)	Turbidity (NTU)
Surface	10.49	9.35	7.74	39.9	0.4
1	10.51	9.25	7.57	39.7	0.4
2	10.54	9.23	7.56	39.7	0.5
3	10.23	9.31	7.60	39.7	0.4
4	9.96	9.41	7.53	39.8	0.5

PRE- AND POST-TREATMENT MONITORING (all monitoring conducted as outlined in DFW's NPDES permit WA0041009):

Impact to non-targeted organisms – Zooplankton were sampled at Frater Lake for diversity and abundance just prior to treatment, and will be sampled again at six months and 12 months post-treatment. Results will be available by separate report.

Liquid rotenone formulation longevity – The shallow, shoreline areas of Frater Lake were treated with CFT. Water samples were taken in an area of the lake where the heaviest concentrations of liquid rotenone were applied (bay on south end of the lake) 24 hours and eight weeks post-treatment to check for residues related to the carriers present in the liquid formulation of rotenone. Samples were sent to an accredited lab for analyses per EPA methods. Samples were analyzed for 63 volatile organic compounds and 75 semi-volatile organic compounds, and detection limits were 0.2-10.0 ug/l, variously. In the 24-hour sample and the 8-week sample, the amounts of all 138 compounds potentially present in liquid rotenone formulations were below detection limits.

Period of Toxicity – Persistent rotenone toxicity will be determined by bioassay. Live trout will be held in a modified minnow trap (1 gal volume with free flow-through) in the lake and survival monitored. Trout exhibit signs of stress and lose equilibrium after three hours at rotenone concentrations of 0.05 ppm product (0.0025 ppm actual rotenone) at water temperatures of 47° F, and response is fairly uniform among individuals in similar circumstances. Rotenone is considered below detection limits when trout remain alive for at least 48 hours. Individual mortalities within a group of trout frequently occur due to mechanical damage when handled or transported/confined in relatively small containers.

Bioassay was not completed before ice-up. However, following ice-out in the spring, bioassay will be completed to ensure detoxification.

GENERAL DESCRIPTION OF TREATMENT PROJECT AND OTHER COMMENTS:

Treatment of Frater Lake was conducted on October 8, 2008. Conditions were generally favorable. Weather was clear and sunny, and the air temperature was 50°F. Rotenone was loaded and delivered the morning of the treatment. A crew of 5 WDFW employees was present. The treatment was staged from a point on the south shoreline of the lake commonly used for walk-in access by anglers. One pumper-boat with a crew of two employees was used to slurry powdered rotenone with lake water. Two employees applied liquid rotenone to shoreline areas using a canoe rigged with a spray tank. One employee managed shoreline operations. Application of powdered rotenone began at 0900 and was completed by noon. Liquid rotenone was applied in the shallows of the lake beginning at 1000 and completed by noon.

Rehabilitation of Frater Lake was considered successful. Dying pumpkinseed sunfish and tench were observed within three hours of beginning treatment. One dead westslope cutthroat trout was also observed. On the following day, large numbers of dead pumpkinseed sunfish and tench were observed throughout the lake, and no live fish were observed.

COST:

Treatment of Frater Lake required about 4 man-days (man-day = 8 hrs) of labor from pre-treatment preparation (signing, sampling, rotenone and equipment transport) through treatment, clean up, and travel. Total cost of treatment (rotenone, labor @ \$268.00/man-day, travel, expendable equipment) was approximately \$3,300.00, including about \$1,072.00 for labor during the treatment and \$2,031.65 for rotenone (1,001 lbs powder @ \$1.65/lb @ 5.0%, delivered; 5 gal liquid @ \$76.00/gal). Estimated time for pre-rehabilitation proposals, general public outreach, post-rehabilitation sampling and reports added 3 days.

ESN NORTHWEST CHEMISTRY LABORATORY

Washington Dept. of Fish & Wildlife
FRATER LAKE REHAB PROJECT
Pend Oreille Co., Washington

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 (360) 459-3432 Fax
lab@esnnw.com

Analytical Results

8260, µg/L (Water)		MTH BLK	LCS Frater Lake	MS	MSD	RPD
Date analyzed	Reporting Limits	10/15/08	10/15/08	10/15/08	10/15/08	10/15/08
Dichlorodifluoromethane	1.0	nd		nd		
Chloromethane	1.0	nd		nd		
Vinyl chloride	0.2	nd		nd		
Bromomethane	1.0	nd		nd		
Chloroethane	1.0	nd		nd		
Trichlorofluoromethane	1.0	nd		nd		
1,1-Dichloroethene	1.0	nd	78%	nd	89%	78%
Methylene chloride	1.0	nd		nd		
trans-1,2-Dichloroethene	1.0	nd		nd		
1,1-Dichloroethane	1.0	nd		nd		
cis-1,2-Dichloroethene	1.0	nd		nd		
2,2-Dichloropropane	1.0	nd		nd		
Chloroform	1.0	nd		nd		
Bromochloromethane	1.0	nd		nd		
1,1,1-Trichloroethane	1.0	nd		nd		
1,2-Dichloroethane	1.0	nd		nd		
1,1-Dichloropropene	1.0	nd		nd		
Carbon tetrachloride	1.0	nd		nd		
Benzene	1.0	nd	93%	nd	100%	90%
Trichloroethene	1.0	nd	92%	nd	104%	91%
1,2-Dichloropropane	1.0	nd		nd		
Dibromomethane	1.0	nd		nd		
Bromodichloromethane	1.0	nd		nd		
cis-1,3-Dichloropropene	1.0	nd		nd		
Toluene	1.0	nd	86%	nd	102%	83%
trans-1,3-Dichloropropene	1.0	nd		nd		
1,1,2-Trichloroethane	1.0	nd		nd		
1,3-Dichloropropane	1.0	nd		nd		
Dibromochloromethane	1.0	nd		nd		
Tetrachloroethene	1.0	nd		nd		
1,2-Dibromoethane (EDB)	1.0	nd		nd		
Chlorobenzene	1.0	nd	96%	nd	106%	89%
1,1,1,2-Tetrachloroethane	1.0	nd		nd		
Ethylbenzene	1.0	nd		nd		
Xylenes	1.0	nd		nd		
Styrene	1.0	nd		nd		
Bromoform	1.0	nd		nd		
1,1,2,2-Tetrachloroethane	1.0	nd		nd		
Isopropylbenzene	1.0	nd		nd		
1,2,3-Trichloropropane	1.0	nd		nd		
Bromobenzene	1.0	nd		nd		
n-Propylbenzene	1.0	nd		nd		
2-Chlorotoluene	1.0	nd		nd		
4-Chlorotoluene	1.0	nd		nd		
1,3,5-Trimethylbenzene	1.0	nd		nd		
tert-Butylbenzene	1.0	nd		nd		
1,2,4-Trimethylbenzene	1.0	nd		nd		
sec-Butylbenzene	1.0	nd		nd		
1,3-Dichlorobenzene	1.0	nd		nd		
1,4-Dichlorobenzene	1.0	nd		nd		
Isopropyltoluene	1.0	nd		nd		
1,2-Dichlorobenzene	1.0	nd		nd		
n-Butylbenzene	1.0	nd		nd		
1,2-Dibromo-3-Chloropropane	1.0	nd		nd		
1,2,4-Trichlorobenzene	1.0	nd		nd		
Naphthalene	1.0	nd		nd		
Hexachloro-1,3-butadiene	1.0	nd		nd		
1,2,3-Trichlorobenzene	1.0	nd		nd		
Surrogate recoveries						
Dibromofluoromethane		92%	90%	95%	92%	94%
Toluene-d8		97%	99%	100%	101%	98%
4-Bromofluorobenzene		102%	104%	106%	117%	105%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NORTHWEST CHEMISTRY LABORATORY

Washington Dept. of Fish & Wildlife
FRATER LAKE REHAB PROJECT
Pend Oreille Co., Washington

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 (360) 459-3432 Fax
lab@esnnw.com

Analytical Results

8270, µg/L	MTH BLK	LCS	Frater Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08
Date analyzed	Limits	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08
Pyridine	2.0	nd		nd		
Aniline	2.0	nd		nd		
Phenol	2.0	nd		nd	81%	5%
2-Chlorophenol	2.0	nd		nd	106%	4%
Bis (2-chloroethyl) ether	2.0	nd		nd		
1,3-Dichlorobenzene	2.0	nd		nd		
1,4-Dichlorobenzene	2.0	nd	124%	nd	102%	2%
1,2-Dichlorobenzene	2.0	nd		nd		
N-methylpyrrolidone	2.0	nd		nd		
Benzyl alcohol	2.0	nd		nd		
2-Methylphenol (o-cresol)	2.0	nd		nd		
Bis (2-chloroisopropyl) ether	10.0	nd		nd		
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd		
Hexachloroethane	2.0	nd		nd		
N-Nitroso-di-n-propylamine	2.0	nd		nd	108%	1%
Nitrobenzene	2.0	nd		nd		
Isophorone	2.0	nd		nd		
2-Nitrophenol	10.0	nd		nd		
4-Nitrophenol	10.0	nd		nd		
2,4-Dimethylphenol	2.0	nd		nd	82%	2%
Bis (2-chloroethoxy) methane	2.0	nd		nd		
2,4-Dichlorophenol	10.0	nd		nd		
1,2,4-Trichlorobenzene	2.0	nd		nd	124%	3%
Naphthalene	2.0	nd		nd		
4-Chloroaniline	10.0	nd		nd		
Hexachlorobutadiene	2.0	nd	126%	nd		
4-Chloro-3-methylphenol	10.0	nd		nd	66%	0%
2-Methylnaphthalene	2.0	nd		nd		
1-Methylnaphthalene	2.0	nd		nd		
Hexachlorocyclopentadiene	2.0	nd		nd		
2,4,6-Trichlorophenol	10.0	nd		nd		
2,4,5-Trichlorophenol	10.0	nd		nd		
2-Chloronaphthalene	2.0	nd		nd		
2-Nitroaniline	10.0	nd		nd		
1,4-Dinitrobenzene	10.0	nd		nd		
Dimethylphthalate	2.0	nd		nd		
Acenaphthylene	0.2	nd		nd		
1,3-Dinitrobenzene	10.0	nd		nd		
2,6-Dinitrotoluene	2.0	nd		nd		
1,2-Dinitrobenzene	2.0	nd		nd		
Acenaphthene	0.2	nd	131%	nd	115%	2%
3-Nitroaniline	10.0	nd		nd		
Dibenzofuran	2.0	nd		nd		
2,4-Dinitrotoluene	2.0	nd		nd	94%	4%
2,3,4,6-Tetrachlorophenol	2.0	nd		nd		
2,3,5,6-Tetrachlorophenol	2.0	nd		nd		
2,4-Dinitrophenol	10.0	nd		nd		
Fluorene	0.2	nd		nd		

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Analytical Results

8270, µg/L		MTH BLK	LCS	Frater Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08	
Date analyzed	Limits	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08	
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	83%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	126%	nd			
Pyrene	0.2	nd		nd	78%	79%	1%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	96%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	80%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

Surrogate recoveries

2-Fluorophenol	80%	115%	122%	84%	83%
Phenol-d6	96%	105%	129%	88%	86%
Nitrobenzene-d5	118%	124%	99%	86%	83%
2-Fluorobiphenyl	91%	134%	103%	89%	87%
2,4,6-Tribromophenol	69%	91%	62%	50%	52%
4-Terphenyl-d14	79%	130%	84%	75%	73%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %

Phenol - d5: 10-135 %

2,4,6- tribromophenol: 29-159%

Nitrobenzene - d5: 20-120 %

2-Fluorobiphenyl: 50-150%

p-Terphenyl-d14: 50-150%

Acceptable RPD limit: 35%



Olympia: (360) 459-4670
Bellevue: (360) 957-9872

CHAIN-OF-CUSTODY RECORD

CLIENT: WDFW DATE: 10/03/2008 PAGE: OF:

ADDRESS: 2315 N. Discovery Pl., Spokane Valley, WA 99216 PROJECT NAME: Foster Lake Keloh

PHONE: (509) 892-1001 FAX: (509) 724-2441 LOCATION: Foster Lake, Pend Oreille Co., WA

CLIENT PROJECT #: 684 7362 x 27 COLLECTOR: Bill Bate DATE OF COLLECTION: 10/03/08

PROJECT MANAGER: Bill Bate

Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES															NOTES	Total Number of Containers	Laboratory Note Number
1.	Surface	13:30			TPH-HCP	VOA 80219 BTEX	TPH-Gasoline	TPH-Diesel	TPH-Diesel & Oil	PAHs 8270	PCBs 8092	CL pesticides 8081	MTCA 8 Metals	Pb	Asbestos-PLM	GRO Sulfate	GRO Sulfate	GRO Sulfate		VOA or Semi VOA		
2.																				Tramples and		
3.																						
4.																						
5.																				Amthal		
6.																				pyrithione		
7.																						
8.																						
9.																						
10.																						
11.																						
12.																						
13.																						
14.																						
15.																						
16.																						
17.																						
18.																						

RELINQUISHED BY (Signature) [Signature] DATE/TIME 10/03/08 14:27 RECEIVED BY (Signature) [Signature] DATE/TIME 10/10/08

RELINQUISHED BY (Signature) [Signature] DATE/TIME 10/03/08 14:27 RECEIVED BY (Signature) [Signature] DATE/TIME 10/10/08

SAMPLE DISPOSAL INSTRUCTIONS

☐ ESN DISPOSAL @ \$2.00 each ☐ Return ☐ Pickup

LABORATORY NOTES:

TOTAL NUMBER OF CONTAINERS:

CHAIN OF CUSTODY SEALS Y/NNA:

SEALS INTACT? Y/NNA:

RECEIVED GOOD COND./COLD:

NOTES:

Turn Around Time: 24 HR 48 HR 5 DAY

ESN NORTHWEST CHEMISTRY LABORATORY

WA Dept. of Fish & Wildlife
FRATER LAKE REHAB PROJECT
Pend Oreille Co., Washington

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(360) 459-4670 (360) 459-3432 Fax
lab@esnnw.com

Analytical Results

8260, µg/L (Water)	Reporting Limits	MTH BLK	LCS	Frater Lake	MS	MSD
Date analyzed						
Dichlorodifluoromethane	1.0	nd		nd		
Chloromethane	1.0	nd		nd		
Vinyl chloride	0.2	nd		nd		
Bromomethane	1.0	nd		nd		
Chloroethane	1.0	nd		nd		
Trichlorofluoromethane	1.0	nd		nd		
Acetone	10.0	nd		nd		
1,1-Dichloroethene	1.0	nd		nd		
Methylene chloride	1.0	nd		nd		
Methyl-t-butyl ether (MTBE)	1.0	nd		nd		
trans-1,2-Dichloroethene	1.0	nd		nd		
1,1-Dichloroethane	1.0	nd		nd		
2-Butanone (MEK)	10.0	nd		nd		
cis-1,2-Dichloroethene	1.0	nd		nd		
2,2-Dichloropropane	1.0	nd		nd		
Chloroform	1.0	nd		nd		
Bromochloromethane	1.0	nd		nd		
1,1,1-Trichloroethane	1.0	nd		nd		
1,2-Dichloroethane (EDC)	1.0	nd		nd		
1,1-Dichloropropene	1.0	nd		nd		
Carbon tetrachloride	1.0	nd		nd		
Benzene	1.0	nd	101%	nd	100%	100%
Trichloroethene (TCE)	1.0	nd	93%	nd	93%	93%
1,2-Dichloropropane	1.0	nd		nd		
Dibromomethane	1.0	nd		nd		
Bromodichloromethane	1.0	nd		nd		
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd		
cis-1,3-Dichloropropene	1.0	nd		nd		
Toluene	1.0	nd	116%	nd	116%	116%
trans-1,3-Dichloropropene	1.0	nd		nd		
1,1,2-Trichloroethane	1.0	nd		nd		
2-Hexanone	1.0	nd		nd		
1,3-Dichloropropane	1.0	nd		nd		
Dibromochloromethane	1.0	nd		nd		
Tetrachloroethene (PCE)	1.0	nd	78%	nd	130%	142%
1,2-Dibromoethane (EDB)	1.0	nd		nd		
Chlorobenzene	1.0	nd		nd		
1,1,1,2-Tetrachloroethane	1.0	nd		nd		
Ethylbenzene	1.0	nd	124%	nd	124%	123%
Xylenes	3.0	nd	123%	nd	125%	120%
Styrene	1.0	nd		nd		
Bromoform	1.0	nd		nd		
1,1,2,2-Tetrachloroethane	1.0	nd		nd		
Isopropylbenzene	1.0	nd		nd		
1,2,3-Trichloropropane	1.0	nd		nd		
Bromobenzene	1.0	nd		nd		
n-Propylbenzene	1.0	nd		nd		
2-Chlorotoluene	1.0	nd		nd		
4-Chlorotoluene	1.0	nd		nd		
1,3,5-Trimethylbenzene	1.0	nd		nd		
tert-Butylbenzene	1.0	nd		nd		
1,2,4-Trimethylbenzene	1.0	nd		nd		
sec-Butylbenzene	1.0	nd		nd		
1,3-Dichlorobenzene	1.0	nd		nd		
1,4-Dichlorobenzene	1.0	nd		nd		
Isopropyltoluene	1.0	nd		nd		
1,2-Dichlorobenzene	1.0	nd		nd		
n-Butylbenzene	1.0	nd		nd		
1,2-Dibromo-3-Chloropropane	1.0	nd		nd		
1,2,4-Trichlorobenzene	1.0	nd		nd		
Naphthalene	1.0	nd	85%	nd		
Hexachloro-1,3-butadiene	1.0	nd		nd		
1,2,3-Trichlorobenzene	1.0	nd		nd		
Surrogate recoveries						
Dibromofluoromethane		88%	85%	110%	101%	98%
Toluene-d8		104%	107%	111%	121%	118%
4-Bromofluorobenzene		103%	107%	111%	114%	114%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel: (425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S81216.2
Client: WDFW
Client Job Name: Frater Lake Rehab

Analytical Results

8270, µg/L	MTH BLK		LCS	Frater Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
Date analyzed	Limits	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	94%	93%	1%
2-Chlorophenol	2.0	nd		nd	115%	111%	4%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	103%	nd	101%	102%	1%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexachlorethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	123%	122%	1%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd			
2,4-Dimethylphenol	2.0	nd		nd	107%	107%	0%
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	116%	118%	2%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	123%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	81%	81%	0%
2-Methylnaphthalene	2.0	nd		nd			
1-Methylnaphthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinitrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	131%	nd	98%	97%	1%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd	88%	87%	1%
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel: (425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S81216.2
Client: WDFW
Client Job Name: Frater Lake Rehab

Analytical Results

8270, µg/L	MTH BLK		LCS	Frater Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
Date analyzed	Limits	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	125%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	127%	nd			
Pyrene	0.2	nd		nd	89%	86%	3%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	86%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	82%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

Surrogate recoveries

2-Fluorophenol	92%	112%	115%	89%	91%
Phenol-d6	95%	125%	90%	96%	99%
Nitrobenzene-d5	111%	131%	87%	92%	93%
2-Fluorobiphenyl	86%	125%	78%	81%	84%
2,4,6-Tribromophenol	63%	127%	69%	78%	78%
4-Terphenyl-d14	85%	82%	82%	79%	78%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %

Phenol - d5: 10-135 %

2,4,6- tribromophenol: 29-159%

Nitrobenzene - d5: 20-120 %

2-Fluorobiphenyl: 50-150%

p-Terphenyl-d14: 50-150%

Acceptable RPD limit: 35%

POST-REHABILITATION REPORT

Water: Lake Ellen

Location: Sec 26 and 27, T35N, R36E; approximately 14 miles north of Inchelium, Ferry County, WA.

DATES TREATED: October 7, 2008

PURPOSE: Improve trout survival and growth through reduction of undesirable fish populations.

LISENCED APPLICATOR: Robert Jateff, Washington Department of Fish and Wildlife (WDFW), District 6 Fisheries Biologist, Pesticide License # 74965. Jon Anderson, WDFW, Native Resident Species Fisheries Manager, Pesticide License # 69176.

LAKE DESCRIPTION full pool and (at treatment, if different):

Full pool at treatment.

Surface acres: 78.0

Depth: average ~ 15 ft; maximum 34 ft

Volume: 1,137 acre-feet

Weight of Water: 2,963,944,598 lbs.

Connectivity: Inlets – Intermittent streams on northeast and northwest corners of lake. Outlet – Intermittent connection to La Fleur Creek.

TREATMENT DESCRIPTION:

Toxicant used: Rotenone - Cube powdered Fish Toxicant EPA Reg # 6458-6; Liquid CFT Legumine EPA Reg # 75338-2

<u>Date</u>	<u>Actual Rotenone used</u>		<u>ppm (product)</u>
	<u>Powder</u> lbs @ conc.	<u>Liquid</u> gals @ 5%	
10/07/2008	2,035 @ 7.0%	10 (CFT)	1.0

Equivalent 2,849 @ 5.0%

All powder was slurried with lake water, and liquid was mixed with lake water and sprayed in shallow waters.

The lake was treated at a rotenone concentration of 1 ppm product (0.05 ppm actual rotenone).

Detoxification Procedures: treated waters naturally detoxified. No detoxification was necessary, as there was no surface water connection to the outlet stream.

SPECIES OF FISH ERADICATED IN ORDER OF RELATIVE ABUNDANCE:

Species, size; estimated abundance

Green sunfish	3-6"; thousands (maximum estimate = 10,000)
Largemouth bass	4-16"; hundreds (maximum estimate = 1000)
Rainbow trout	12-15"; tens (6 observed, maximum estimate = 30)

PHYSICAL CHARACTERISTICS OF THE LAKE DURING TREATMENT:

Pre-treatment water quality parameters – October 3, 2008.

Depth (m)	Water temp (°C)	D.O. (mg/L)	pH	Conductivity (µS/cm)	Turbidity (NTU)
Surface	15.63	9.46	7.87	157.5	0.0
1	15.47	9.45	8.10	158.0	0.0
2	15.26	9.45	8.21	158.2	0.0
3	15.15	9.05	8.22	158.8	0.0
4	14.90	9.02	8.23	158.2	0.0
5	14.77	8.94	8.24	158.4	0.0
6	14.45	8.05	8.07	158.9	0.0
7	14.38	7.00	7.88	160.6	3.3

PRE- AND POST-TREATMENT MONITORING (all monitoring conducted as outlined in DFW's NPDES permit WA0041009):

Impact to non-targeted organisms – Zooplankton were sampled at Lake Ellen for diversity and abundance just prior to treatment, and will be sampled again at six months and 12 months post-treatment. Results will be available by separate report.

Liquid rotenone formulation longevity – The shallow, shoreline areas of Lake Ellen were treated with CFT. Water samples were taken in an area of the lake where the heaviest concentrations of liquid rotenone were applied (boat launch on west end of the lake) 24 hours and eight weeks post-treatment to check for residues related to the carriers present in the liquid formulation of rotenone. Samples were sent to an accredited lab for analyses per EPA methods. Samples were analyzed for 63 volatile organic compounds and 75 semi-volatile organic compounds, and detection limits were 0.2-10.0 ug/l, variously. In the 24-hour sample and the 8-week sample, the amounts of all 138 compounds potentially present in liquid rotenone formulations were below detection limits.

Period of Toxicity – Persistent rotenone toxicity will be determined by bioassay. Live trout will be held in a modified minnow trap (1 gal volume with free flow-through) in the lake and survival monitored. Trout exhibit signs of stress and lose equilibrium after three hours at rotenone concentrations of 0.05 ppm product (0.0025 ppm actual rotenone) at water temperatures of 47° F, and response is fairly uniform among individuals in similar circumstances. Rotenone is considered below detection limits when trout remain alive for at least 48 hours. Individual mortalities within a group of trout frequently occur due

to mechanical damage when handled or transported/confined in relatively small containers.

Bioassay was not completed before ice-up. However, following ice-out in the spring, bioassay will be completed to ensure detoxification.

GENERAL DESCRIPTION OF TREATMENT PROJECT AND OTHER COMMENTS:

Treatment of Lake Ellen was conducted on October 7, 2008. Conditions were generally favorable. Weather was clear and sunny with light winds from the north. Rotenone was loaded and delivered the morning of the treatment. A crew of 7 WDFW employees was present. The treatment was staged at the boat launch located on the west end of the lake. Two pumper-boats were used to slurry powdered rotenone with lake water, and each boat had a crew of two employees. Two employees also crewed the airboat, which was used to apply liquid rotenone to shoreline areas. One employee managed shoreline operations. Application of powdered rotenone began at 0900 and was completed by noon. Liquid rotenone application was concentrated in the shallows of the west and east ends of the lake. Liquid rotenone application began at 1000 and was completed by noon.

Rehabilitation of Lake Ellen was considered successful. Dying green sunfish and largemouth bass were observed within three hours of beginning treatment. Small numbers of dead rainbow trout were also observed. The following day, October 8, large numbers of dead green sunfish and largemouth bass were observed around the shoreline, and no live fish were observed anywhere in the lake.

COST:

Treatment of Lake Ellen required about 6 man-days (man-day = 8 hrs) of labor from pre-treatment preparation (signing, sampling, rotenone and equipment transport) through treatment, clean up, and travel. Total cost of treatment (rotenone, labor @ \$268.00/man-day, travel, expendable equipment) was approximately \$6,100.00, including about \$1,608.00 for labor during the treatment and \$4,117.75 for rotenone (2,035 lbs powder @ \$1.65/lb @ 5.0%, delivered; 10 gal liquid @ \$76.00/gal). Estimated time for pre-rehabilitation proposals, general public outreach, post-rehabilitation sampling and reports added 3 days.

ESN NORTHWEST CHEMISTRY LABORATORY

Washington Dept. of Fish & Wildlife
LAKE ELLEN REHAB PROJECT
Ferry Co., Washington

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 (360) 459-3432
lab@esnnw.com

Analytical Results

8260, µg/L (Water)	MTH BLK	LCS Lake Ellen	MS	MSD	RPD
Date analyzed	Reporting Limits	10/15/08	10/15/08	10/15/08	10/15/08
Dichlorodifluoromethane	1.0	nd	nd		
Chloromethane	1.0	nd	nd		
Vinyl chloride	0.2	nd	nd		
Bromomethane	1.0	nd	nd		
Chloroethane	1.0	nd	nd		
Trichlorofluoromethane	1.0	nd	nd		
1,1-Dichloroethene	1.0	nd	78%	89%	78% 13%
Methylene chloride	1.0	nd	nd		
trans-1,2-Dichloroethene	1.0	nd	nd		
1,1-Dichloroethane	1.0	nd	nd		
cis-1,2-Dichloroethene	1.0	nd	nd		
2,2-Dichloropropane	1.0	nd	nd		
Chloroform	1.0	nd	nd		
Bromochloromethane	1.0	nd	nd		
1,1,1-Trichloroethane	1.0	nd	nd		
1,2-Dichloroethane	1.0	nd	nd		
1,1-Dichloropropene	1.0	nd	nd		
Carbon tetrachloride	1.0	nd	nd		
Benzene	1.0	nd	93%	100%	90% 11%
Trichloroethene	1.0	nd	92%	104%	91% 13%
1,2-Dichloropropane	1.0	nd	nd		
Dibromomethane	1.0	nd	nd		
Bromodichloromethane	1.0	nd	nd		
cis-1,3-Dichloropropene	1.0	nd	nd		
Toluene	1.0	nd	86%	102%	83% 21%
trans-1,3-Dichloropropene	1.0	nd	nd		
1,1,2-Trichloroethane	1.0	nd	nd		
1,3-Dichloropropane	1.0	nd	nd		
Dibromochloromethane	1.0	nd	nd		
Tetrachloroethene	1.0	nd	nd		
1,2-Dibromoethane (EDB)	1.0	nd	nd		
Chlorobenzene	1.0	nd	96%	108%	89% 17%
1,1,1,2-Tetrachloroethane	1.0	nd	nd		
Ethylbenzene	1.0	nd	nd		
Xylenes	1.0	nd	nd		
Styrene	1.0	nd	nd		
Bromoform	1.0	nd	nd		
1,1,2,2-Tetrachloroethane	1.0	nd	nd		
Isopropylbenzene	1.0	nd	nd		
1,2,3-Trichloropropane	1.0	nd	nd		
Bromobenzene	1.0	nd	nd		
n-Propylbenzene	1.0	nd	nd		
2-Chlorotoluene	1.0	nd	nd		
4-Chlorotoluene	1.0	nd	nd		
1,3,5-Trimethylbenzene	1.0	nd	nd		
tert-Butylbenzene	1.0	nd	nd		
1,2,4-Trimethylbenzene	1.0	nd	nd		
sec-Butylbenzene	1.0	nd	nd		
1,3-Dichlorobenzene	1.0	nd	nd		
1,4-Dichlorobenzene	1.0	nd	nd		
Isopropyltoluene	1.0	nd	nd		
1,2-Dichlorobenzene	1.0	nd	nd		
n-Butylbenzene	1.0	nd	nd		
1,2-Dibromo-3-Chloropropane	1.0	nd	nd		
1,2,4-Trichlorobenzene	1.0	nd	nd		
Naphthalene	1.0	nd	nd		
Hexachloro-1,3-butadiene	1.0	nd	nd		
1,2,3-Trichlorobenzene	1.0	nd	nd		
Surrogate recoveries					
Dibromofluoromethane		92%	90%	97%	92% 94%
Toluene-d8		97%	99%	93%	101% 98%
4-Bromofluorobenzene		102%	104%	98%	117% 105%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits: 65% TO 135%

Acceptable RPD limit: 35%

ESN NORTHWEST CHEMISTRY LABORATORY

Washington Dept. of Fish & Wildlife
LAKE ELLEN REHAB PROJECT
Ferry Co., Washington

ESN Northwest
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Olympia, WA 98501
(360) 459-4670 (360) 459-3432 F
lab@esnvw.com

Analytical Results

8270, µg/L	MTH BLK		LCS Lake Ellen		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08	
Date analyzed	Limits	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08	
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	81%	85%	5%
2-Chlorophenol	2.0	nd		nd	106%	110%	4%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	124%	nd	102%	100%	2%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresc	2.0	nd		nd			
Hexachloroethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	108%	109%	1%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd			
2,4-Dimethylphenol	2.0	nd		nd	82%	84%	2%
Bis (2-chloroethoxy) methan	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	124%	120%	3%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	126%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	66%	66%	0%
2-Methylnaphthalene	2.0	nd		nd			
1-Methylnaphthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinitrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	131%	nd	115%	117%	2%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd	94%	98%	4%
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			

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Analytical Results

8270, µg/L	MTH BLK		LCS Lake Ellen		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08	
Date analyzed	Limits	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08	
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	83%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	126%	nd			
Pyrene	0.2	nd		nd	78%	79%	1%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	96%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	80%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

Surrogate recoveries

2-Fluorophenol	80%	115%	135%	84%	83%
Phenol-d6	96%	105%	107%	88%	86%
Nitrobenzene-d5	118%	124%	110%	86%	83%
2-Fluorobiphenyl	91%	134%	115%	89%	87%
2,4,6-Tribromophenol	69%	91%	67%	50%	52%
4-Terphenyl-d14	79%	130%	89%	75%	73%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %
Phenol - d5: 10-135 %
2,4,6- tribromophenol: 29-159%
Nitrobenzene - d5: 20-120 %
2-Fluorobiphenyl: 50-150%
p-Terphenyl-d14: 50-150%
Acceptable RPD limit: 35%



Environmental
Services Network

Olympia: (360) 459-4670
Bellevue: (360) 957-9872

CHAIN-OF-CUSTODY RECORD

CLIENT: Washington Department of Fish & Wildlife (WDFW)

ADDRESS: 2315 N. Discovery Place, Spokane Valley, WA 99216

PHONE: (509) 892-1009 FAX: (509) 924-2441

CLIENT PROJECT #: _____ PROJECT MANAGER: Bill Baker

DATE: 10/08/2008 PAGE 1 OF 1

PROJECT NAME: Lake Ellen Rehabilitation

LOCATION: Lake Ellen, Ferry Co., WA

COLLECTOR: Bill Baker

DATE OF
COLLECTION 10/08/08

Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES										NOTES	Total Number of Containers	Laboratory Note Number
					TPH-HCD BTEX	TPH-Gasoline	TPH-Diesel	TPH-Diesel & Oil	PAHs 8270	PCBs 2022	Chlorinated 8081	PCBs 8270	PCBs 8270	PCBs 8270			
1.	Surface	16:08			X			X							VOC & Semi-Voc		
2.		16:10			X			X							Samples		
3.		16:11			X			X									
4.		16:12			X			X							Methyl		
5.		16:13			X			X							Pyrene/fluorene		
6.																	
7.																	
8.																	
9.																	
10.																	
11.																	
12.																	
13.																	
14.																	
15.																	
16.																	
17.																	
18.																	

LABORATORY NOTES:

only received
1 Amber (broke)
10/10/08

Turn Around Time: 24 HR 48 HR 5 DAY

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS

CHAIN OF CUSTODY SEALS Y/N/NA

SEALS INTACT? Y/N/NA

RECEIVED GOOD COND./COLD

NOTES:

SAMPLE DISPOSAL INSTRUCTIONS

☐ ESN DISPOSAL @ \$2.00 each ☐ Return ☐ Pickup

ESN NORTHWEST CHEMISTRY LABORATORY

WA Dept. of Fish & Wildlife
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Ferry Co., Washington

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lab@esnnw.com

Analytical Results

8260, µg/L (Water)	Reporting	MTH BLK	LCS	Lake Ellen	MS	MSD
Date analyzed	Limits					
Dichlorodifluoromethane	1.0	nd		nd		
Chloromethane	1.0	nd		nd		
Vinyl chloride	0.2	nd		nd		
Bromomethane	1.0	nd		nd		
Chloroethane	1.0	nd		nd		
Trichlorofluoromethane	1.0	nd		nd		
Acetone	10.0	nd		nd		
1,1-Dichloroethene	1.0	nd		nd		
Methylene chloride	1.0	nd		nd		
Methyl-t-butyl ether (MTBE)	1.0	nd		nd		
trans-1,2-Dichloroethene	1.0	nd		nd		
1,1-Dichloroethane	1.0	nd		nd		
2-Butanone (MEK)	10.0	nd		nd		
cis-1,2-Dichloroethene	1.0	nd		nd		
2,2-Dichloropropane	1.0	nd		nd		
Chloroform	1.0	nd		nd		
Bromochloromethane	1.0	nd		nd		
1,1,1-Trichloroethane	1.0	nd		nd		
1,2-Dichloroethane (EDC)	1.0	nd		nd		
1,1-Dichloropropene	1.0	nd		nd		
Carbon tetrachloride	1.0	nd		nd		
Benzene	1.0	nd	101%	nd	100%	100%
Trichloroethene (TCE)	1.0	nd	93%	nd	93%	93%
1,2-Dichloropropane	1.0	nd		nd		
Dibromomethane	1.0	nd		nd		
Bromodichloromethane	1.0	nd		nd		
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd		
cis-1,3-Dichloropropene	1.0	nd		nd		
Toluene	1.0	nd	116%	nd	116%	116%
trans-1,3-Dichloropropene	1.0	nd		nd		
1,1,2-Trichloroethane	1.0	nd		nd		
2-Hexanone	1.0	nd		nd		
1,3-Dichloropropane	1.0	nd		nd		
Dibromochloromethane	1.0	nd		nd		
Tetrachloroethene (PCE)	1.0	nd	78%	nd	130%	142%
1,2-Dibromoethane (EDB)	1.0	nd		nd		
Chlorobenzene	1.0	nd		nd		
1,1,1,2-Tetrachloroethane	1.0	nd		nd		
Ethylbenzene	1.0	nd	124%	nd	124%	123%
Xylenes	3.0	nd	123%	nd	125%	120%
Styrene	1.0	nd		nd		
Bromoform	1.0	nd		nd		
1,1,2,2-Tetrachloroethane	1.0	nd		nd		
Isopropylbenzene	1.0	nd		nd		
1,2,3-Trichloropropane	1.0	nd		nd		
Bromobenzene	1.0	nd		nd		
n-Propylbenzene	1.0	nd		nd		
2-Chlorotoluene	1.0	nd		nd		
4-Chlorotoluene	1.0	nd		nd		
1,3,5-Trimethylbenzene	1.0	nd		nd		
tert-Butylbenzene	1.0	nd		nd		
1,2,4-Trimethylbenzene	1.0	nd		nd		
sec-Butylbenzene	1.0	nd		nd		
1,3-Dichlorobenzene	1.0	nd		nd		
1,4-Dichlorobenzene	1.0	nd		nd		
Isopropyltoluene	1.0	nd		nd		
1,2-Dichlorobenzene	1.0	nd		nd		
n-Butylbenzene	1.0	nd		nd		
1,2-Dibromo-3-Chloropropane	1.0	nd		nd		
1,2,4-Trichlorobenzene	1.0	nd		nd		
Naphthalene	1.0	nd	85%	nd		
Hexachloro-1,3-butadiene	1.0	nd		nd		
1,2,3-Trichlorobenzene	1.0	nd		nd		

Surrogate recoveries

Dibromofluoromethane	88%	85%	109%	101%	98%
Toluene-d8	104%	107%	113%	121%	118%
4-Bromofluorobenzene	103%	107%	111%	114%	114%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S81216.1
Client: WDFW
Client Job Name: Lake Ellen Rehab

Analytical Results

8270, µg/L	MTH BLK		LCS	Lake Ellen Rehab	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
Date analyzed	Limits	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	94%	93%	1%
2-Chlorophenol	2.0	nd		nd	115%	111%	4%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	103%	nd	101%	102%	1%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexachloroethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	123%	122%	1%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd			
2,4-Dimethylphenol	2.0	nd		nd	107%	107%	0%
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	116%	118%	2%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	123%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	81%	81%	0%
2-Methylnaphthalene	2.0	nd		nd			
1-Methylnaphthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinitrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	131%	nd	98%	97%	1%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd	88%	87%	1%
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S81216.1
Client: WDFW
Client Job Name: Lake Ellen Rehab

Analytical Results

8270, µg/L	MTH BLK		LCS Lake Ellen Rehab		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
Date analyzed	Limits	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	125%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	127%	nd			
Pyrene	0.2	nd		nd	89%	86%	3%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	86%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	82%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

Surrogate recoveries

2-Fluorophenol	92%	112%	95%	89%	91%
Phenol-d6	95%	125%	62%	96%	99%
Nitrobenzene-d5	111%	131%	93%	92%	93%
2-Fluorobiphenyl	86%	125%	80%	81%	84%
2,4,6-Tribromophenol	63%	127%	61%	78%	78%
4-Terphenyl-d14	85%	82%	82%	79%	78%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %

Phenol - d5: 10-135 %

2,4,6- tribromophenol: 29-159%

Nitrobenzene - d5: 20-120 %

2-Fluorobiphenyl: 50-150%

p-Terphenyl-d14: 50-150%

Acceptable RPD limit: 35%

POST-REHABILITATION REPORT

Water: Hatch Lake and Little Hatch Lake

Location: Sec 30 and 31, T35N, R40E; approximately 5.25 miles southeast of Colville, Stevens County, WA.

DATES TREATED: October 8 and 9, 2008

PURPOSE: Improve trout survival and growth through reduction of undesirable fish populations.

LISENCED APPLICATOR: Robert Jateff, Washington Department of Fish and Wildlife (WDFW), District 6 Fisheries Biologist, Pesticide License # 74965. Jon Anderson, WDFW, Native Resident Species Fisheries Manager, Pesticide License # 69176.

LAKE DESCRIPTIONS full pool and (at treatment, if different):

Hatch Lake

Full pool at treatment.
Surface acres: 34.0 Depth: average ~ 16 ft; maximum 34 ft
Volume: 540 acre-feet Weight of Water: 1,407,678,192 lbs.
Connectivity: Inlets – Spill-over from Little Hatch Lake during high-water years. Outlet – Intermittent outflow to adjacent wetlands.

Little Hatch Lake

Full pool at treatment.
Surface acres: 14.0 Depth: average ~ 3 ft; maximum 4 ft
Volume: 74 acre-feet Weight of Water: 192,904,048 lbs.
Connectivity: Inlets – Intermittent stream channel from Keogh Lake.
Outlet – Spill-over into Hatch Lake during high-water years.

TREATMENT DESCRIPTION:

Toxicant used: Rotenone - Cube powdered Fish Toxicant EPA Reg # 6458-6; Liquid CFT Legumine EPA Reg # 75338-2

Water	Date	<u>Actual Rotenone used</u>		
		Powder lbs @ conc.	Liquid gals @ 5%	ppm (product)
Hatch Lake	10/09/2008	880 @ 7.0%	8 (CFT)	1.0
Little Hatch Lake	10/08/2008	165 @ 7.0%	2 (CFT)	1.0
Equivalent		1,463 @ 5.0%	10	

All powder was slurried with lake water, and liquid was mixed with lake water and sprayed in shallow waters.

The lake was treated at a rotenone concentration of 1 ppm product (0.05 ppm actual rotenone).

Detoxification Procedures: treated waters naturally detoxified. No detoxification was necessary, as there was no surface water connection to the outlet stream.

SPECIES OF FISH ERADICATED IN ORDER OF RELATIVE ABUNDANCE:

Water - species, size, estimated abundance

Hatch Lake

Yellow perch 3-6"; thousands (maximum estimate = 75,000)

Little Hatch Lake

Rainbow trout 3-5"; tens (maximum estimate = 100)

PHYSICAL CHARACTERISTICS OF THE LAKE DURING TREATMENT:

Hatch Lake

Pre-treatment water quality parameters – October 3, 2008.

Depth (m)	Water temp (°C)	D.O. (mg/L)	pH	Conductivity (µS/cm)	Turbidity (NTU)
Surface	16.01	10.95	9.36	508.6	2.0
1	15.31	9.60	9.40	508.7	3.7
2	14.85	7.93	9.43	511.1	3.8
3	14.70	5.23	9.36	514.1	3.6
4	14.42	4.03	9.32	516.6	3.6

Little Hatch Lake

Pre-treatment water quality parameters – October 6, 2008.

Depth (m)	Water temp (°C)	D.O. (mg/L)	pH	Conductivity (µS/cm)	Turbidity (NTU)
Surface	13.08	5.89	7.99	487.3	0.0
1	12.97	6.23	8.09	489.9	0.0

PRE- AND POST-TREATMENT MONITORING (all monitoring conducted as outlined in DFW's NPDES permit WA0041009):

Impact to non-targeted organisms – Zooplankton were sampled at Hatch and Little Hatch lakes for diversity and abundance just prior to treatment, and will be sampled again at six months and 12 months post-treatment. Results will be available by separate report.

Liquid rotenone formulation longevity – The shallow, shoreline areas of Hatch and Little Hatch lakes were treated with CFT. Water samples were taken in an area of the lake where the heaviest concentrations of liquid rotenone were applied (near boat launch on northeast side of Hatch Lake and from shoreline on south end of Little Hatch Lake) 24 hours and eight weeks post-treatment to check for residues related to the carriers present in the liquid formulation of rotenone. Samples were sent to an accredited lab for analyses per EPA methods. Samples were analyzed for 63 volatile organic compounds and 75 semi-volatile organic compounds, and detection limits were 0.2-10.0 ug/l, variously. In the 24-hour sample and the 8-week sample, the amounts of all 138 compounds potentially present in liquid rotenone formulations were below detection limits.

Period of Toxicity – Persistent rotenone toxicity will be determined by bioassay. Live trout will be held in a modified minnow trap (1 gal volume with free flow-through) in the lake and survival monitored. Trout exhibit signs of stress and lose equilibrium after three hours at rotenone concentrations of 0.05 ppm product (0.0025 ppm actual rotenone) at water temperatures of 47° F, and response is fairly uniform among individuals in similar circumstances. Rotenone is considered below detection limits when trout remain alive for at least 48 hours. Individual mortalities within a group of trout frequently occur due to mechanical damage when handled or transported/confined in relatively small containers.

Bioassay was not completed before ice-up. However, following ice-out in the spring, bioassay will be completed to ensure detoxification.

GENERAL DESCRIPTION OF TREATMENT PROJECT AND OTHER COMMENTS:

Hatch Lake

Treatment of Hatch Lake was conducted on October 9, 2008. Conditions were generally favorable. Weather was clear and sunny with light winds from the north-west. Rotenone was loaded and delivered to the lake following treatment of Williams Lake earlier in the morning. A crew of 7 WDFW employees was present. The treatment was staged at the boat launch located on the north-east side of the lake. Two pumper-boats were used to slurry powdered rotenone with lake water, and each boat had a crew of two employees. Two employees also crewed the airboat, which was used to apply liquid rotenone to shoreline areas. One employee managed shoreline operations. Application of powdered rotenone began at 1300 and was completed by 1700. Liquid rotenone application was concentrated in the shallows around the entire lake. Liquid rotenone application began at 1400 and was completed by 1630.

Rehabilitation of Hatch Lake was considered successful. Dying yellow perch were observed within three hours of beginning treatment. The following day, large numbers of dead yellow perch were observed around the shoreline. No rainbow trout were observed on either day.

Little Hatch Lake

Treatment of Little Hatch Lake was conducted on October 8, 2008. Weather was clear and sunny with no wind and temperatures near 60°F. Rotenone was loaded and delivered to the lake on the morning of treatment. A crew of 2 WDFW employees was present. The treatment was staged from the south side of the lake, near a primitive boat launch. Two employees crewed a pumper-boat which was used to slurry powdered rotenone with lake water. Immediately following application of powdered rotenone, the two employees used an airboat to apply liquid rotenone to shoreline areas. Application of powdered rotenone began at 0900 and was completed by 1000. Liquid rotenone application was concentrated in the shallows around the entire lake. Liquid rotenone application began at 1000 and was completed by 1100.

Little Hatch Lake was treated to prevent re-infestation of Hatch Lake with yellow perch during years of high water, through surface water connection. However, treatment of Little Hatch Lake yielded no yellow perch, resulting only in the eradication of a small number of rainbow trout which had been planted earlier in the spring. Despite the absence of yellow perch during this treatment, it seems prudent to consider treating this lake again if/when Hatch Lake receives rehabilitation in the future, if there are years of high water in the interim.

COST:

Treatment of Hatch and Little Hatch lakes required about 8 man-days (man-day = 8 hrs) of labor from pre-treatment preparation (signing, sampling, rotenone and equipment transport) through treatment, clean up, and travel. Total cost of treatment (rotenone, labor @ \$268.00/man-day, travel, expendable equipment) was approximately \$5,000.00, including about \$2,144.00 for labor during the treatment and \$2484.25 for rotenone (1,045 lbs powder @ \$1.65/lb @ 5.0%, delivered; 10 gal liquid @ \$76.00/gal). Estimated time for pre-rehabilitation proposals, general public outreach, post-rehabilitation sampling and reports added 3 days.

ESN NORTHWEST CHEMISTRY LABORATORY

Washington Dept. of Fish & Wildlife
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Stevens Co., Washington

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Olympia, WA 98501
(360) 459-4670 (360) 459-3432
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Analytical Results

8260, µg/L (Water)	MTH BLK	LCS Hatch Lake	MS	MSD	RPD
Date analyzed	Reporting Limits	10/15/08	10/15/08	10/15/08	10/15/08
Dichlorodifluoromethane	1.0	nd	nd		
Chloromethane	1.0	nd	nd		
Vinyl chloride	0.2	nd	nd		
Bromomethane	1.0	nd	nd		
Chloroethane	1.0	nd	nd		
Trichlorofluoromethane	1.0	nd	nd		
1,1-Dichloroethene	1.0	nd	78%	nd	89% 78% 13%
Methylene chloride	1.0	nd	nd	nd	
trans-1,2-Dichloroethene	1.0	nd	nd	nd	
1,1-Dichloroethane	1.0	nd	nd	nd	
cis-1,2-Dichloroethene	1.0	nd	nd	nd	
2,2-Dichloropropane	1.0	nd	nd	nd	
Chloroform	1.0	nd	nd	nd	
Bromochloromethane	1.0	nd	nd	nd	
1,1,1-Trichloroethane	1.0	nd	nd	nd	
1,2-Dichloroethane	1.0	nd	nd	nd	
1,1-Dichloropropene	1.0	nd	nd	nd	
Carbon tetrachloride	1.0	nd	nd	nd	
Benzene	1.0	nd	93%	nd	100% 90% 11%
Trichloroethene	1.0	nd	92%	nd	104% 91% 13%
1,2-Dichloropropane	1.0	nd	nd	nd	
Dibromomethane	1.0	nd	nd	nd	
Bromodichloromethane	1.0	nd	nd	nd	
cis-1,3-Dichloropropene	1.0	nd	nd	nd	
Toluene	1.0	nd	86%	nd	102% 83% 21%
trans-1,3-Dichloropropene	1.0	nd	nd	nd	
1,1,2-Trichloroethane	1.0	nd	nd	nd	
1,3-Dichloropropane	1.0	nd	nd	nd	
Dibromochloromethane	1.0	nd	nd	nd	
Tetrachloroethene	1.0	nd	nd	nd	
1,2-Dibromoethane (EDB)	1.0	nd	nd	nd	
Chlorobenzene	1.0	nd	96%	nd	106% 88% 17%
1,1,1,2-Tetrachloroethane	1.0	nd	nd	nd	
Ethylbenzene	1.0	nd	nd	nd	
Xylenes	1.0	nd	nd	nd	
Styrene	1.0	nd	nd	nd	
Bromoform	1.0	nd	nd	nd	
1,1,2,2-Tetrachloroethane	1.0	nd	nd	nd	
Isopropylbenzene	1.0	nd	nd	nd	
1,2,3-Trichloropropane	1.0	nd	nd	nd	
Bromobenzene	1.0	nd	nd	nd	
n-Propylbenzene	1.0	nd	nd	nd	
2-Chlorotoluene	1.0	nd	nd	nd	
4-Chlorotoluene	1.0	nd	nd	nd	
1,3,5-Trimethylbenzene	1.0	nd	nd	nd	
tert-Butylbenzene	1.0	nd	nd	nd	
1,2,4-Trimethylbenzene	1.0	nd	nd	nd	
sec-Butylbenzene	1.0	nd	nd	nd	
1,3-Dichlorobenzene	1.0	nd	nd	nd	
1,4-Dichlorobenzene	1.0	nd	nd	nd	
Isopropyltoluene	1.0	nd	nd	nd	
1,2-Dichlorobenzene	1.0	nd	nd	nd	
n-Butylbenzene	1.0	nd	nd	nd	
1,2-Dibromo-3-Chloropropane	1.0	nd	nd	nd	
1,2,4-Trichlorobenzene	1.0	nd	nd	nd	
Naphthalene	1.0	nd	nd	nd	
Hexachloro-1,3-butadiene	1.0	nd	nd	nd	
1,2,3-Trichlorobenzene	1.0	nd	nd	nd	
Surrogate recoveries					
Dibromofluoromethane		92%	90%	95%	92% 94%
Toluene-d8		97%	99%	98%	101% 98%
4-Bromofluorobenzene		102%	104%	103%	117% 105%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits: 65% TO 135%

Acceptable RPD limit: 35%

ESN NORTHWEST CHEMISTRY LABORATORY

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Stevens Co., Washington

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Analytical Results

8270, µg/L	MTH BLK		LCS Hatch Lake		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/16/08	10/16/08	10/16/08	10/13/08	10/13/08	
Date analyzed	Limits	10/16/08	10/16/08	10/16/08	10/13/08	10/13/08	
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	81%	85%	5%
2-Chlorophenol	2.0	nd		nd	106%	110%	4%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	120%	nd	102%	100%	2%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresc	2.0	nd		nd			
Hexachloroethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	108%	109%	1%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd			
2,4-Dimethylphenol	2.0	nd		nd	82%	84%	2%
Bis (2-chloroethoxy) methan	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	124%	120%	3%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	129%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	66%	66%	0%
2-Methylnaphthalene	2.0	nd		nd			
1-Methylnaphthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinitrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	102%	nd	115%	117%	2%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd	94%	98%	4%
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			

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Analytical Results:

8270, µg/L	MTH BLK		LCS Hatch Lake		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/16/08	10/16/08	10/16/08	10/13/08	10/13/08	
Date analyzed	Limits	10/16/08	10/16/08	10/16/08	10/13/08	10/13/08	
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	132%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	125%	nd			
Pyrene	0.2	nd		nd	78%	79%	1%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	78%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	73%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

Surrogate recoveries

2-Fluorophenol	85%	110%	126%	84%	83%
Phenol-d6	103%	115%	133%	88%	86%
Nitrobenzene-d5	126%	134%	87%	86%	83%
2-Fluorobiphenyl	86%	126%	91%	89%	87%
2,4,6-Tribromophenol	63%	41%	52%	50%	52%
4-Terphenyl-d14	76%	124%	79%	75%	73%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %

Phenol - d5: 10-135 %

2,4,6- tribromophenol: 29-159%

Nitrobenzene - d5: 20-120 %

2-Fluorobiphenyl: 50-150%

p-Terphenyl-d14: 50-150%

Acceptable RPD limit: 35%



Environmental
Services Network

Olympia: (360) 459-4670
Bellevue: (360) 957-9872

CHAIN-OF-CUSTODY RECORD

CLIENT: Washington Department of Fish & Wildlife (WDFW)

ADDRESS: 2365 N. Discovery Place, Snohomish, WA 98296

PHONE: (509) 872-1001 FAX: (509) 924-2441

CLIENT PROJECT #: PROJECT MANAGER: Jill Barker

DATE: 11/10/2008 PAGE 1 OF 1

PROJECT NAME: Hatch Lake Rehab

LOCATION: Hatch Lake, Stevens Co, WA

COLLECTOR: Jan Anderson

DATE OF
COLLECTION: 10/10/08

Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES										NOTES	Total Number of Containers	Laboratory Note Number
					TPH-High	TPH-Medium	TPH-Low	TPH-Diesel	TPH-Diesel & Oil	TPH-Diesel	TPH-Diesel	TPH-Diesel	TPH-Diesel	TPH-Diesel			
1	Surface	05:30			X										10/10/08		
2															Sample 2270		
3																	
4															10/10/08		
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME	SAMPLE RECEIPT		LABORATORY NOTES:	
Jan. Anderson	10/13/08	Jan. Anderson	10/13/08	TOTAL NUMBER OF CONTAINERS			
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME	CHAIN OF CUSTODY SEALS Y/N/A			
				SEALS INTACT? Y/N/A			
				RECEIVED GOOD COND./COLD			
				NOTES:			
				SAMPLE DISPOSAL INSTRUCTIONS			
				<input type="checkbox"/> ESN DISPOSAL @ \$2.00 each <input type="checkbox"/> Return <input type="checkbox"/> Pickup			
				Turn Around Time: 24 HR 48 HR 5 DAY			

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Stevens Co., Washington

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Analytical Results

8260, µg/L (Water)	Reporting	MTH BLK	LCS	Hatch Lake	MS	MSD	RPD
Date analyzed	Limits	12/18/08	12/18/08	12/18/08	12/18/08	12/18/08	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
Acetone	10.0	nd		nd			
1,1-Dichloroethene	1.0	nd	124%	nd	124%	123%	0.8%
Methylene chloride	1.0	nd		nd			
Methyl-t-butyl ether (MTBE)	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
2-Butanone (MEK)	10.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	101%	nd	100%	100%	0.0%
Trichloroethene (TCE)	1.0	nd	93%	nd	93%	93%	0.0%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	116%	nd	116%	116%	0.0%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
2-Hexanone	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene (PCE)	1.0	nd		nd			
1,2-Dibromoethane (EDB)	1.0	nd		nd			
Chlorobenzene	1.0	nd	123%	nd	125%	120%	4.1%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	3.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			

ESN NORTHWEST CHEMISTRY LABORATORY

WA Dept. of Fish & Wildlife
HATCH LAKE REHAB PROJECT
Stevens Co., Washington

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 (360) 459-3432 Fax
lab@esnnw.com

Analytical Results

8260, µg/L (Water)	Reporting	MTH BLK	LCS	Hatch Lake	MS	MSD	RPD
Date analyzed	Limits	12/18/08	12/18/08	12/18/08	12/18/08	12/18/08	
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

Surrogate recoveries

Dibromofluoromethane	88%	85%	110%	101%	98%
Toluene-d8	104%	107%	107%	121%	118%
4-Bromofluorobenzene	103%	107%	112%	114%	114%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

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Analytical Results

8270, µg/L		MTH BLK	LCS	HatchLake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
Date analyzed	Limits	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	94%	93%	1%
2-Chlorophenol	2.0	nd		nd	115%	111%	4%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	103%	nd	101%	102%	1%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexachloroethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	123%	122%	1%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd			
2,4-Dimethylphenol	2.0	nd		nd	107%	107%	0%
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	116%	118%	2%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	123%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	81%	81%	0%
2-Methylnaphthalene	2.0	nd		nd			
1-Methylnaphthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinitrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	131%	nd	98%	97%	1%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd	88%	87%	1%
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			

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Analytical Results

8270, µg/L		MTH BLK	LCS	HatchLake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
Date analyzed	Limits	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	125%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	127%	nd			
Pyrene	0.2	nd		nd	89%	86%	3%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	86%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	82%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

Surrogate recoveries

2-Fluorophenol	92%	112%	117%	89%	91%
Phenol-d6	95%	125%	72%	96%	99%
Nitrobenzene-d5	111%	131%	78%	92%	93%
2-Fluorobiphenyl	86%	125%	94%	81%	84%
2,4,6-Tribromophenol	63%	127%	60%	78%	78%
4-Terphenyl-d14	85%	82%	81%	79%	78%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %

Phenol - d5: 10-135 %

2,4,6- tribromophenol: 29-159%

Nitrobenzene - d5: 20-120 %

2-Fluorobiphenyl: 50-150%

p-Terphenyl-d14: 50-150%

Acceptable RPD limit: 35%

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Analytical Results

8260, µg/L (Water)	MTH.BLK	LCS, Little Hatch Lake	MS	MSD	RPD
Date analyzed	Reporting Limits	10/15/08	10/15/08	10/15/08	10/15/08
Dichlorodifluoromethane	1.0	nd	nd		
Chloromethane	1.0	nd	nd		
Vinyl chloride	0.2	nd	nd		
Bromomethane	1.0	nd	nd		
Chloroethane	1.0	nd	nd		
Trichlorofluoromethane	1.0	nd	nd		
1,1-Dichloroethene	1.0	nd	78%	nd	89% 78% 13%
Methylene chloride	1.0	nd	nd		
trans-1,2-Dichloroethene	1.0	nd	nd		
1,1-Dichloroethane	1.0	nd	nd		
cis-1,2-Dichloroethene	1.0	nd	nd		
2,2-Dichloropropane	1.0	nd	nd		
Chloroform	1.0	nd	nd		
Bromochloromethane	1.0	nd	nd		
1,1,1-Trichloroethane	1.0	nd	nd		
1,2-Dichloroethane	1.0	nd	nd		
1,1-Dichloropropene	1.0	nd	nd		
Carbon tetrachloride	1.0	nd	nd		
Benzene	1.0	nd	93%	nd	100% 90% 11%
Trichloroethene	1.0	nd	92%	nd	104% 91% 13%
1,2-Dichloropropane	1.0	nd	nd		
Dibromomethane	1.0	nd	nd		
Bromodichloromethane	1.0	nd	nd		
cis-1,3-Dichloropropene	1.0	nd	nd		
Toluene	1.0	nd	86%	nd	102% 83% 21%
trans-1,3-Dichloropropene	1.0	nd	nd		
1,1,2-Trichloroethane	1.0	nd	nd		
1,3-Dichloropropane	1.0	nd	nd		
Dibromochloromethane	1.0	nd	nd		
Tetrachloroethane	1.0	nd	nd		
1,2-Dibromoethane (EDB)	1.0	nd	nd		
Chlorobenzene	1.0	nd	95%	nd	106% 89% 17%
1,1,1,2-Tetrachloroethane	1.0	nd	nd		
Ethylbenzene	1.0	nd	nd		
Xylenes	1.0	nd	nd		
Styrene	1.0	nd	nd		
Bromoform	1.0	nd	nd		
1,1,2,2-Tetrachloroethane	1.0	nd	nd		
Isopropylbenzene	1.0	nd	nd		
1,2,3-Trichloropropane	1.0	nd	nd		
Bromobenzene	1.0	nd	nd		
n-Propylbenzene	1.0	nd	nd		
2-Chlorotoluene	1.0	nd	nd		
4-Chlorotoluene	1.0	nd	nd		
1,3,5-Trimethylbenzene	1.0	nd	nd		
tert-Butylbenzene	1.0	nd	nd		
1,2,4-Trimethylbenzene	1.0	nd	nd		
sec-Butylbenzene	1.0	nd	nd		
1,3-Dichlorobenzene	1.0	nd	nd		
1,4-Dichlorobenzene	1.0	nd	nd		
Isopropyltoluene	1.0	nd	nd		
1,2-Dichlorobenzene	1.0	nd	nd		
n-Butylbenzene	1.0	nd	nd		
1,2-Dibromo-3-Chloropropane	1.0	nd	nd		
1,2,4-Trichlorobenzene	1.0	nd	nd		
Naphthalene	1.0	nd	nd		
Hexachloro-1,3-butadiene	1.0	nd	nd		
1,2,3-Trichlorobenzene	1.0	nd	nd		
Surrogate recoveries					
Dibromofluoromethane		92%	90%	93%	92% 94%
Toluene-d8		97%	99%	97%	101% 98%
4-Bromofluorobenzene		102%	104%	103%	117% 105%

Data Qualifiers and Analytical Comments:

nd = not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NORTHWEST CHEMISTRY LABORATORY

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Stevens Co., Washington

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lab@esnnw.com

8270, µg/L	MTH BLK		LCS Little Hatch		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08	
Date analyzed	Limits	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08	
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	81%	85%	5%
2-Chlorophenol	2.0	nd		nd	106%	110%	4%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	124%	nd	102%	100%	2%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresc	2.0	nd		nd			
Hexachloroethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	108%	109%	1%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd			
2,4-Dimethylphenol	2.0	nd		nd	82%	84%	2%
Bis (2-chloroethoxy) methan	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	124%	120%	3%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	126%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	66%	66%	0%
2-Methylnaphthalene	2.0	nd		nd			
1-Methylnaphthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinitrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	131%	nd	115%	117%	2%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd	94%	98%	4%
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			

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8270, µg/L	MTH BLK		LCS Little Hatch		MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08	
Date analyzed	Limits	10/13/08	10/13/08	10/13/08	10/13/08	10/13/08	
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	83%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	126%	nd			
Pyrene	0.2	nd		nd	78%	79%	1%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	96%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	80%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

Surrogate recoveries

2-Fluorophenol	80%	115%	131%	84%	83%
Phenol-d6	96%	105%	111%	88%	86%
Nitrobenzene-d5	118%	124%	101%	86%	83%
2-Fluorobiphenyl	91%	134%	101%	89%	87%
2,4,6-Tribromophenol	69%	91%	66%	50%	52%
4-Terphenyl-d14	79%	130%	83%	75%	73%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %

Phenol - d5: 10-135 %

2,4,6-tribromophenol: 29-159%

Nitrobenzene - d5: 20-120 %

2-Fluorobiphenyl: 50-150%

p-Terphenyl-d14: 50-150%

Acceptable RPD limit: 35%

CHAIN-OF-CUSTODY RECORD

Olympia: (360) 459-4670
Belleuve: (360) 957-9872

CLIENT: Washington Department of Fish & Wildlife (WDFW)

ADDRESS: 2315 N. DISCOVERY, PLACER, SPOKANE VALLEY, WA 99216

PHONE: (504) 892-1001 FAX: (504) 924-2641

CLIENT PROJECT #: _____ PROJECT MANAGER: Bill Baker

DATE: 10/09/2007 PAGE 1 OF 1

PROJECT NAME: Little Hinton Lake Rebuilds

LOCATION: Little Hatch Lake, Stearns Co., WA

COLLECTOR: Bill Boyer DATE OF COLLECTION 10/20/68

PROJECT MANAGER: P. H. Barker

[illegible]

LABORATORY NOTES:

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS

CHAIN OF CUSTODY SEALS Y/M/NA

SEALS INTACT? YNANA

RECEIVED GOOD COND. COLD

NOTES:

SAMPLE DISPOSAL INSTRUCTIONS

☐ ESN DISPOSAL @ \$2.00 each ☐ Return ☐ Pickup

Turn Around Time: 24 HR 48 HR 5 DAY

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Analytical Results

8260, µg/L (Water)	Reporting	MTH BLK	LCS	Little Hatch Lake	MS	MSD	RPD
Date analyzed	Limits	12/18/08	12/18/08	12/18/08	12/18/08	12/18/08	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
Acetone	10.0	nd		nd			
1,1-Dichloroethene	1.0	nd	124%	nd	124%	123%	0.8%
Methylene chloride	1.0	nd		nd			
Methyl-t-butyl ether (MTBE)	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
2-Butanone (MEK)	10.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	101%	nd	100%	100%	0.0%
Trichloroethene (TCE)	1.0	nd	93%	nd	93%	93%	0.0%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	116%	nd	116%	116%	0.0%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
2-Hexanone	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene (PCE)	1.0	nd		nd			
1,2-Dibromoethane (EDB)	1.0	nd		nd			
Chlorobenzene	1.0	nd	123%	nd	125%	120%	4.1%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	3.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			

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Analytical Results

8260, µg/L (Water)	Reporting	MTH BLK	LCS	Little Hatch Lake	MS	MSD	RPD
Date analyzed	Limits	12/18/08	12/18/08	12/18/08	12/18/08	12/18/08	
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

Surrogate recoveries

Dibromofluoromethane	88%	85%	108%	101%	98%
Toluene-d8	104%	107%	110%	121%	118%
4-Bromofluorobenzene	103%	107%	111%	114%	114%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NORTHWEST CHEMISTRY LABORATORY

Washington Department of Fish & Wildlife
LITTLE HATCH LAKE REHAB PROJECT
Stevens Co., Washington

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Analytical Results

8270, µg/L	MTH BLK	LCS	Little Hatch	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water
Date extracted	Reporting	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08
Date analyzed	Limits	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08
Pyridine	2.0	nd	nd			
Aniline	2.0	nd	nd			
Phenol	2.0	nd	nd	94%	93%	1%
2-Chlorophenol	2.0	nd	nd	115%	111%	4%
Bis (2-chloroethyl) ether	2.0	nd	nd			
1,3-Dichlorobenzene	2.0	nd	nd			
1,4-Dichlorobenzene	2.0	nd	103%	101%	102%	1%
1,2-Dichlorobenzene	2.0	nd	nd			
N-methylpyrrolidone	2.0	nd	nd			
Benzyl alcohol	2.0	nd	nd			
2-Methylphenol (o-cresol)	2.0	nd	nd			
Bis (2-chloroisopropyl) ether	10.0	nd	nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd	nd			
Hexachloroethane	2.0	nd	nd			
N-Nitroso-di-n-propylamine	2.0	nd	nd	123%	122%	1%
Nitrobenzene	2.0	nd	nd			
Isophorone	2.0	nd	nd			
2-Nitrophenol	10.0	nd	nd			
4-Nitrophenol	10.0	nd	nd			
2,4-Dimethylphenol	2.0	nd	nd	107%	107%	0%
Bis (2-chloroethoxy) methane	2.0	nd	nd			
2,4-Dichlorophenol	10.0	nd	nd			
1,2,4-Trichlorobenzene	2.0	nd	nd	116%	118%	2%
Naphthalene	2.0	nd	nd			
4-Chloroaniline	10.0	nd	nd			
Hexachlorobutadiene	2.0	nd	123%			
4-Chloro-3-methylphenol	10.0	nd	nd	81%	81%	0%
2-Methylnaphthalene	2.0	nd	nd			
1-Methylnaphthalene	2.0	nd	nd			
Hexachlorocyclopentadiene	2.0	nd	nd			
2,4,6-Trichlorophenol	10.0	nd	nd			
2,4,5-Trichlorophenol	10.0	nd	nd			
2-Chloronaphthalene	2.0	nd	nd			
2-Nitroaniline	10.0	nd	nd			
1,4-Dinitrobenzene	10.0	nd	nd			
Dimethylphthalate	2.0	nd	nd			
Acenaphthylene	0.2	nd	nd			
1,3-Dinitrobenzene	10.0	nd	nd			
2,6-Dinitrotoluene	2.0	nd	nd			
1,2-Dinitrobenzene	2.0	nd	nd			
Acenaphthene	0.2	nd	131%	98%	97%	1%
3-Nitroaniline	10.0	nd	nd			
Dibenzofuran	2.0	nd	nd			
2,4-Dinitrotoluene	2.0	nd	nd	88%	87%	1%
2,3,4,6-Tetrachlorophenol	2.0	nd	nd			
2,3,5,6-Tetrachlorophenol	2.0	nd	nd			
2,4-Dinitrophenol	10.0	nd	nd			
Fluorene	0.2	nd	nd			

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Analytical Results

8270, µg/L		MTH BLK	LCS	Little Hatch	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
Date analyzed	Limits	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	125%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	127%	nd			
Pyrene	0.2	nd		nd	89%	86%	3%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	86%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	82%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

Surrogate recoveries

2-Fluorophenol	92%	112%	111%	89%	91%
Phenol-d6	95%	125%	100%	96%	99%
Nitrobenzene-d5	111%	131%	89%	92%	93%
2-Fluorobiphenyl	86%	125%	81%	81%	84%
2,4,6-Tribromophenol	63%	127%	61%	78%	78%
4-Terphenyl-d14	85%	82%	75%	79%	78%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %

Phenol - d5: 10-135 %

2,4,6- tribromophenol: 29-159%

Nitrobenzene - d5: 20-120 %

2-Fluorobiphenyl: 50-150%

p-Terphenyl-d14: 50-150%

Acceptable RPD limit: 35%

POST-REHABILITATION REPORT

Water: Williams Lake

Location: Sec 36, T38N, R38E; approximately 14 miles northwest of Colville, Stevens County, WA.

DATES TREATED: October 9, 2008

PURPOSE: Improve trout survival and growth through reduction of undesirable fish populations.

LISENCED APPLICATOR: Robert Jateff, Washington Department of Fish and Wildlife (WDFW), District 6 Fisheries Biologist, Pesticide License # 74965. Jon Anderson, WDFW, Native Resident Species Fisheries Manager, Pesticide License # 69176.

LAKE DESCRIPTION full pool and (at treatment, if different):

Full pool at treatment.

Surface acres: 38.0

Depth: average ~ 26 ft; maximum 47 ft

Volume: 1,058 acre-feet

Weight of Water: 2,665,600,000 lbs.

Connectivity: Inlets – Intermittent stream. Outlet – None.

TREATMENT DESCRIPTION:

Toxicant used: Rotenone - Cube powdered Fish Toxicant EPA Reg # 6458-6; Liquid CFT Legumine EPA Reg # 75338-2

Date	<u>Actual Rotenone used</u>		ppm (product)
	Powder lbs @ conc.	Liquid gals @ 5%	
10/09/2008	1,870 @ 7.0%	5 (CFT)	1.0

Equivalent 2,618 @ 5.0%

All powder was slurried with lake water, and liquid was mixed with lake water and sprayed in shallow waters.

The lake was treated at a rotenone concentration of 1 ppm product (0.05 ppm actual rotenone).

Detoxification Procedures: treated waters naturally detoxified. No detoxification was necessary, as there was no surface water connection to the outlet stream.

SPECIES OF FISH ERADICATED IN ORDER OF RELATIVE ABUNDANCE:

Species, size; estimated abundance

Yellow perch	3-6"; thousands (maximum estimate = 75,000)
Goldfish	1-6"; hundreds (maximum estimate = 1000)
Rainbow trout	10-14"; tens (10 observed, maximum estimate = 50)

PHYSICAL CHARACTERISTICS OF THE LAKE DURING TREATMENT:

Pre-treatment water quality parameters – October 3, 2008.

Depth (m)	Water temp (°C)	D.O. (mg/L)	pH	Conductivity (µS/cm)	Turbidity (NTU)
Surface	15.28	7.78	7.95	371.0	0.0
1	15.31	7.76	8.15	370.1	0.0
2	15.34	7.71	8.26	370.0	3.3
3	15.35	7.65	8.28	370.8	0.1
4	15.35	7.62	8.30	370.6	0.0
5	15.34	7.53	8.29	370.8	0.0
6	15.33	7.49	8.29	370.8	0.0
7	15.31	7.42	8.29	371.3	0.0
8	15.14	5.79	8.11	373.6	0.7
9	11.56	0.60	7.51	445.5	17.2
10	8.73	0.27	7.18	449.6	7.4
11	7.99	0.20	7.06	456.0	8.8
12	7.67	0.19	7.02	458.2	12.2

PRE- AND POST-TREATMENT MONITORING (all monitoring conducted as outlined in DFW's NPDES permit WA0041009):

Impact to non-targeted organisms – Zooplankton were sampled at Williams Lake for diversity and abundance just prior to treatment, and will be sampled again at six months and 12 months post-treatment. Results will be available by separate report.

Liquid rotenone formulation longevity – The shallow, shoreline areas of Williams Lake were treated with CFT. Water samples were taken in an area of the lake where the heaviest concentrations of liquid rotenone were applied (boat launch on west end of the lake) 24 hours and eight weeks post-treatment to check for residues related to the carriers present in the liquid formulation of rotenone. Samples were sent to an accredited lab for analyses per EPA methods. Samples were analyzed for 63 volatile organic compounds and 75 semi-volatile organic compounds, and detection limits were 0.2-10.0 ug/l, variously. In the 24-hour sample and the 8-week sample, the amounts of all 138 compounds potentially present in liquid rotenone formulations were below detection limits.

Period of Toxicity – Persistent rotenone toxicity will be determined by bioassay. Live trout will be held in a modified minnow trap (1 gal volume with free flow-through) in the lake and survival monitored. Trout exhibit signs of stress and lose equilibrium after three hours at rotenone concentrations of 0.05 ppm product (0.0025 ppm actual rotenone) at water temperatures of 47° F, and response is fairly uniform among individuals in similar circumstances. Rotenone is considered below detection limits when trout remain alive for at least 48 hours. Individual mortalities within a group of trout frequently occur due to mechanical damage when handled or transported/confined in relatively small containers.

Bioassay was not completed before ice-up. However, following ice-out in the spring, bioassay will be completed to ensure detoxification.

GENERAL DESCRIPTION OF TREATMENT PROJECT AND OTHER COMMENTS:

Treatment of Williams Lake was conducted on October 9, 2008. Conditions were generally favorable. Weather was clear and sunny with light winds from the north-west. Rotenone was loaded and delivered the morning of the treatment. A crew of 7 WDFW employees was present. The treatment was staged at the boat launch located on the east side of the lake. Two pumper-boats were used to slurry powdered rotenone with lake water, and each boat had a crew of two employees. Two employees also crewed the airboat, which was used to apply liquid rotenone to shoreline areas. One employee managed shoreline operations. Application of powdered rotenone began at 0900 and was completed by noon. Liquid rotenone application was concentrated in the shallows around the entire lake. Liquid rotenone application began at 1000 and was completed by noon.

Rehabilitation of Williams Lake was considered fairly successful. Dying yellow perch were observed within three hours of beginning treatment. One dying goldfish was also observed immediately following treatment, as well as small numbers of dead rainbow trout. The following day, very large numbers of dead yellow perch were observed around the shoreline. Moderate numbers of dead and dying goldfish were also observed.

Williams Lake was treated with rotenone at a concentration of 1 ppm to remove yellow perch. Goldfish, which were not captured during pre-rehabilitation fish sampling of the lake (and consequently were unknown to WDFW personnel), were present in moderate numbers. It is unlikely that rotenone treatment at 1 ppm eliminated the goldfish population, as goldfish are capable of withstanding rotenone concentrations of this magnitude. Therefore, it is likely that the goldfish population will expand in future years, and Williams Lake will require rehabilitation again within 5-7 years.

COST:

Treatment of Williams Lake required about 6 man-days (man-day = 8 hrs) of labor from pre-treatment preparation (signing, sampling, rotenone and equipment transport) through treatment, clean up, and travel. Total cost of treatment (rotenone, labor @ \$268.00/man-day, travel, expendable equipment) was approximately \$5,275.00, including about \$1,608.00 for labor during the treatment and \$3,465.50 for rotenone (1,870 lbs powder @ \$1.65/lb @ 5.0%, delivered; 5 gal liquid @ \$76.00/gal). Estimated time for pre-rehabilitation proposals, general public outreach, post-rehabilitation sampling and reports added 3 days.

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Analytical Results

8260, µg/L (Water)	Reporting	MTH BLK	LCS Williams Lake	MS	MSD	RPD
Date analyzed	Limits	10/15/08	10/15/08	10/15/08	10/15/08	10/15/08
Dichlorodifluoromethane	1.0	nd		nd		
Chloromethane	1.0	nd		nd		
Vinyl chloride	0.2	nd		nd		
Bromomethane	1.0	nd		nd		
Chloroethane	1.0	nd		nd		
Trichlorofluoromethane	1.0	nd		nd		
1,1-Dichloroethene	1.0	nd	78%	nd	89%	78%
Methylene chloride	1.0	nd		nd		
trans-1,2-Dichloroethene	1.0	nd		nd		
1,1-Dichloroethane	1.0	nd		nd		
cis-1,2-Dichloroethene	1.0	nd		nd		
2,2-Dichloropropane	1.0	nd		nd		
Chloroform	1.0	nd		nd		
Bromochloromethane	1.0	nd		nd		
1,1,1-Trichloroethane	1.0	nd		nd		
1,2-Dichloroethane	1.0	nd		nd		
1,1-Dichloropropene	1.0	nd		nd		
Carbon tetrachloride	1.0	nd		nd		
Benzene	1.0	nd	93%	nd	100%	90%
Trichloroethene	1.0	nd	92%	nd	104%	91%
1,2-Dichloropropane	1.0	nd		nd		
Dibromomethane	1.0	nd		nd		
Bromodichloromethane	1.0	nd		nd		
cis-1,3-Dichloropropene	1.0	nd		nd		
Toluene	1.0	nd	86%	nd	102%	83%
trans-1,3-Dichloropropene	1.0	nd		nd		
1,1,2-Trichloroethane	1.0	nd		nd		
1,3-Dichloropropane	1.0	nd		nd		
Dibromodichloromethane	1.0	nd		nd		
Tetrachloroethene	1.0	nd		nd		
1,2-Dibromoethane (EDB)	1.0	nd		nd		
Chlorobenzene	1.0	nd	98%	nd	106%	89%
1,1,1,2-Tetrachloroethane	1.0	nd		nd		
Ethylbenzene	1.0	nd		nd		
Xylenes	1.0	nd		nd		
Styrene	1.0	nd		nd		
Bromoform	1.0	nd		nd		
1,1,2,2-Tetrachloroethane	1.0	nd		nd		
Isopropylbenzene	1.0	nd		nd		
1,2,3-Trichloropropane	1.0	nd		nd		
Bromobenzene	1.0	nd		nd		
n-Propylbenzene	1.0	nd		nd		
2-Chlorotoluene	1.0	nd		nd		
4-Chlorotoluene	1.0	nd		nd		
1,3,5-Trimethylbenzene	1.0	nd		nd		
tert-Butylbenzene	1.0	nd		nd		
1,2,4-Trimethylbenzene	1.0	nd		nd		
sec-Butylbenzene	1.0	nd		nd		
1,3-Dichlorobenzene	1.0	nd		nd		
1,4-Dichlorobenzene	1.0	nd		nd		
Isopropyltoluene	1.0	nd		nd		
1,2-Dichlorobenzene	1.0	nd		nd		
n-Butylbenzene	1.0	nd		nd		
1,2-Dibromo-3-Chloropropane	1.0	nd		nd		
1,2,4-Trichlorobenzene	1.0	nd		nd		
Naphthalene	1.0	nd		nd		
Hexachloro-1,3-butadiene	1.0	nd		nd		
1,2,3-Trichlorobenzene	1.0	nd		nd		
Surrogate recoveries						
Dibromofluoromethane		92%	90%	87%	92%	94%
Toluene-d8		97%	99%	97%	101%	98%
4-Bromofluorobenzene		102%	104%	106%	117%	105%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

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Analytical Results

Analytical Results							
8270, µg/L		MTH BLK	LCS	Williams Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	10/16/08	10/16/08	10/16/08	10/13/08	10/13/08	
Date analyzed	Limits	10/16/08	10/16/08	10/16/08	10/13/08	10/13/08	
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	81%	85%	5%
2-Chlorophenol	2.0	nd		nd	106%	110%	4%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	120%	nd	102%	100%	2%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexachlorethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	108%	109%	1%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd			
2,4-Dimethylphenol	2.0	nd		nd	82%	84%	2%
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	124%	120%	3%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	129%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	66%	66%	0%
2-Methylnapthalene	2.0	nd		nd			
1-Methylnapthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinitrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	102%	nd	115%	117%	2%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd	94%	98%	4%
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			

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Analytical Results

8270, µg/L		MTH BLK	LCS Williams Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water
Date extracted	Reporting	10/16/08	10/16/08	10/16/08	10/13/08	10/13/08
Date analyzed	Limits	10/16/08	10/16/08	10/16/08	10/13/08	10/13/08
4-Chlorophenylphenylether	2.0	nd		nd		
Diethylphthalate	2.0	nd		nd		
4-Nitroaniline	10.0	nd		nd		
4,6-Dinitro-2-methylphenol	10.0	nd		nd		
N-nitrosodiphenylamine	2.0	nd	132%	nd		
Azobenzene	2.0	nd		nd		
4-Bromophenylphenylether	2.0	nd		nd		
Hexachlorobenzene	2.0	nd		nd		
Pentachlorophenol	10.0	nd		nd		
Phenanthrene	0.2	nd		nd		
Anthracene	0.2	nd		nd		
Carbazole	2.0	nd		nd		
Di-n-butylphthalate	2.0	nd		nd		
Fluoranthene	0.2	nd	125%	nd	78%	79%
Pyrene	0.2	nd		nd		1%
Butylbenzylphthalate	2.0	nd		nd		
Bis(2-ethylhexyl) adipate	2.0	nd		nd		
Benzo(a)anthracene	0.2	nd		nd		
Chrysene	0.2	nd		nd		
Bis (2-ethylhexyl) phthalate	2.0	nd		nd		
Di-n-octyl phthalate	2.0	nd	78%	nd		
Benzo(b)fluoranthene	0.2	nd		nd		
Benzo(k)fluoranthene	0.2	nd		nd		
Benzo(a)pyrene	0.2	nd	73%	nd		
Dibenzo(a,h)anthracene	0.2	nd		nd		
Benzo(ghi)perylene	0.2	nd		nd		
Indeno(1,2,3-cd)pyrene	0.2	nd		nd		

Surrogate recoveries

2-Fluorophenol	85%	110%	121%	84%	83%
Phenol-d6	103%	115%	126%	88%	86%
Nitrobenzene-d5	126%	134%	91%	86%	83%
2-Fluorobiphenyl	86%	126%	89%	89%	87%
2,4,6-Tribromophenol	63%	41%	50%	50%	52%
4-Terphenyl-d14	76%	124%	72%	75%	73%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %

Phenol - d5: 10-135 %

2,4,6- tribromophenol: 29-159%

Nitrobenzene - d5: 20-120 %

2-Fluorobiphenyl: 50-150%

p-Terphenyl-d14: 50-150%

Acceptable RPD limit: 35%



Environmental
Services Network

Olympia: (360) 459-4670
Bellevue: (360) 957-9872

CHAIN-OF-CUSTODY RECORD

CLIENT: Washington Department of Fish & Wildlife
ADDRESS: 2315 N. Discovery Place, Snohomish Valley, WA 98276
PHONE: (509) 892-1001 FAX: (509) 924-2841
CLIENT PROJECT #: _____ PROJECT MANAGER: Bill Boyer

DATE: 10/10/08 PAGE 1 OF 1
PROJECT NAME: Williams Lake Rehabilitation
LOCATION: Williams Lake, Stevens Co., WA
COLLECTOR: [Signature] DATE OF COLLECTION: 10/10/08

Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES										Total Number of Containers	Laboratory Note Number
					TRI-CLD	TOA 8220	TRI-Gasoline	TRI-Diesel	Semivol 8270	PAHs 8270	PCBs 8082	CL Pesticides 8081	MICA 3 Metals	Pb		
1.	Surface	0740			X	X		X	X							
2.					X	X		X	X							
3.					X	X		X	X							
4.					X	X		X	X							
5.					X	X		X	X							
6.																
7.																
8.																
9.																
10.																
11.																
12.																
13.																
14.																
15.																
16.																
17.																
18.																

RELINQUISHED BY (Signature) <u>[Signature]</u> DATE/TIME <u>10-13-08</u>		RECEIVED BY (Signature) <u>[Signature]</u> DATE/TIME <u>10-13-08</u>			
RELINQUISHED BY (Signature) <u>[Signature]</u> DATE/TIME <u>10-13-08</u>		RECEIVED BY (Signature) <u>[Signature]</u> DATE/TIME <u>10-13-08</u>			
SAMPLE DISPOSAL INSTRUCTIONS					
<input type="checkbox"/> ESN DISPOSAL @ \$2.00 each <input type="checkbox"/> Return <input type="checkbox"/> Pickup					
TOTAL NUMBER OF CONTAINERS					
CHAIN OF CUSTODY SEALS Y/N/A					
SEALS INTACT? Y/N/A					
RECEIVED GOOD COND./COLD					
NOTES:					
LABORATORY NOTES:					
Turn Around Time: 24 HR 48 HR 5 DAY					

ESN NORTHWEST CHEMISTRY LABORATORY

WA Dept. of Fish & Wildlife
WILLIAMS LAKE REHAB PROJECT
Stevens Co., Washington

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 (360) 459-3432 Fax
lab@esnnw.com

Analytical Results

8260, µg/L (Water)	Reporting	MTH BLK	LCS	Williams Lake	MS	MSD
Date analyzed	Limits					
Dichlorodifluoromethane	1.0	nd		nd		
Chloromethane	1.0	nd		nd		
Vinyl chloride	0.2	nd		nd		
Bromomethane	1.0	nd		nd		
Chloroethane	1.0	nd		nd		
Trichlorofluoromethane	1.0	nd		nd		
Acetone	10.0	nd		nd		
1,1-Dichloroethene	1.0	nd		nd		
Methylene chloride	1.0	nd		nd		
Methyl-t-butyl ether (MTBE)	1.0	nd		nd		
trans-1,2-Dichloroethene	1.0	nd		nd		
1,1-Dichloroethane	1.0	nd		nd		
2-Butanone (MEK)	10.0	nd		nd		
cis-1,2-Dichloroethene	1.0	nd		nd		
2,2-Dichloropropane	1.0	nd		nd		
Chloroform	1.0	nd		nd		
Bromochloromethane	1.0	nd		nd		
1,1,1-Trichloroethane	1.0	nd		nd		
1,2-Dichloroethane (EDC)	1.0	nd		nd		
1,1-Dichloropropene	1.0	nd		nd		
Carbon tetrachloride	1.0	nd		nd		
Benzene	1.0	nd	101%	nd	100%	100%
Trichloroethene (TCE)	1.0	nd	93%	nd	93%	93%
1,2-Dichloropropane	1.0	nd		nd		
Dibromomethane	1.0	nd		nd		
Bromodichloromethane	1.0	nd		nd		
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd		
cis-1,3-Dichloropropene	1.0	nd		nd		
Toluene	1.0	nd	116%	nd	116%	116%
trans-1,3-Dichloropropene	1.0	nd		nd		
1,1,2-Trichloroethane	1.0	nd		nd		
2-Hexanone	1.0	nd		nd		
1,3-Dichloropropane	1.0	nd		nd		
Dibromochloromethane	1.0	nd		nd		
Tetrachloroethene (PCE)	1.0	nd	78%	nd	130%	142%
1,2-Dibromoethane (EDB)	1.0	nd		nd		
Chlorobenzene	1.0	nd		nd		
1,1,1,2-Tetrachloroethane	1.0	nd		nd		
Ethylbenzene	1.0	nd	124%	nd	124%	123%
Xylenes	3.0	nd	123%	nd	125%	120%
Styrene	1.0	nd		nd		
Bromoform	1.0	nd		nd		
1,1,2,2-Tetrachloroethane	1.0	nd		nd		
Isopropylbenzene	1.0	nd		nd		
1,2,3-Trichloropropane	1.0	nd		nd		
Bromobenzene	1.0	nd		nd		
n-Propylbenzene	1.0	nd		nd		
2-Chlorotoluene	1.0	nd		nd		
4-Chlorotoluene	1.0	nd		nd		
1,3,5-Trimethylbenzene	1.0	nd		nd		
tert-Butylbenzene	1.0	nd		nd		
1,2,4-Trimethylbenzene	1.0	nd		nd		
sec-Butylbenzene	1.0	nd		nd		
1,3-Dichlorobenzene	1.0	nd		nd		
1,4-Dichlorobenzene	1.0	nd		nd		
Isopropyltoluene	1.0	nd		nd		
1,2-Dichlorobenzene	1.0	nd		nd		
n-Butylbenzene	1.0	nd		nd		
1,2-Dibromo-3-Chloropropane	1.0	nd		nd		
1,2,4-Trichlorobenzene	1.0	nd		nd		
Naphthalene	1.0	nd	85%	nd		
Hexachloro-1,3-butadiene	1.0	nd		nd		
1,2,3-Trichlorobenzene	1.0	nd		nd		

Surrogate recoveries

Dibromofluoromethane	88%	85%	110%	101%	98%
Toluene-d8	104%	107%	110%	121%	118%
4-Bromofluorobenzene	103%	107%	12%	114%	114%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NORTHWEST CHEMISTRY LABORATORY

Washington Department of Fish & Wildlife
 WILLIAMS LAKE REHAB PROJECT
 Stevens County, Washington

ESN Northwest
 1210 Eastside Street SE Suite 200
 Olympia, WA 98501
 (360) 459-4670 (360) 459-3444
 lab@esnnw.com

Analytical Results

8270, µg/L		MTH BLK	LCS	Williams Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
Date analyzed	Limits	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	94%	93%	1%
2-Chloropheno	2.0	nd		nd	115%	111%	4%
Bis (2-chloroethyl) ethe	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	103%	nd	101%	102%	1%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcoho	2.0	nd		nd			
2-Methylphenol (o-cresol	2.0	nd		nd			
Bis (2-chloroisopropyl) ethe	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol	2.0	nd		nd			
Hexachloroethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	123%	122%	1%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitropheno	10.0	nd		nd			
4-Nitropheno	10.0	nd		nd			
2,4-Dimethylpheno	2.0	nd		nd	107%	107%	0%
Bis (2-chloroethoxy) methan	2.0	nd		nd			
2,4-Dichloropheno	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	116%	118%	2%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	123%	nd			
4-Chloro-3-methylpheno	10.0	nd		nd	81%	81%	0%
2-Methylnaphthalene	2.0	nd		nd			
1-Methylnaphthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichloropheno	10.0	nd		nd			
2,4,5-Trichloropheno	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinitrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	131%	nd	98%	97%	1%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd	88%	87%	1%
2,3,4,6-Tetrachloropheno	2.0	nd		nd			
2,3,5,6-Tetrachloropheno	2.0	nd		nd			
2,4-Dinitropheno	10.0	nd		nd			
Fluorene	0.2	nd		nd			

ESN NORTHWEST CHEMISTRY LABORATORY

Washington Department of Fish & Wildlife
WILLIAMS LAKE REHAB PROJECT
Stevens County, Washington

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 · (360) 459-3400
lab@esnww.com

Analytical Results

8270, µg/L		MTH BLK	LCS	Williams Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
Date analyzed	Limits	12/17/08	12/17/08	12/17/08	12/17/08	12/17/08	
4-Chlorophenylphenylethene	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	125%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylethene	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	127%	nd			
Pyrene	0.2	nd		nd	89%	86%	3%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	86%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	82%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

Surrogate recoveries:

2-Fluorophenol	92%	112%	104%	89%	91%
Phenol-d6	95%	125%	89%	96%	99%
Nitrobenzene-d5	111%	131%	89%	92%	93%
2-Fluorobiphenyl	86%	125%	83%	81%	84%
2,4,6-Tribromophenol	63%	127%	65%	78%	78%
4-Terphenyl-d14	85%	82%	85%	79%	78%

Data Qualifiers and Analytical Comment

nd - not detected at listed reporting limit

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %

Phenol - d5: 10-135 %

2,4,6- tribromophenol: 29-159%

Nitrobenzene - d5: 20-120 %

2-Fluorobiphenyl: 50-150%

p-Terphenyl-d14: 50-150%

Acceptable RPD limit: 35%

POST TREATMENT DISCHARGE MONITORING REPORT

1. **Lake Name:** Starzman Lakes
2. **County:** Okanogan
3. **Section:** 36 **Township:** 32N **Range:** 24E
4. **Date of Treatment:** Oct 23, 2008
5. **Purpose of Treatment:** Starzman Lakes are good productive waters that provide a small lakes angling experience for float fishermen as well as shore anglers. Surveys indicated illegal plants of bluegill sunfish, which have compromised the trout fishery in recent years. Competition from bluegill has reduced the average size of yearling trout from 12 inches to 9 inches. Treatment was necessary to restore the lakes to trout only waters.
6. **Name of Licensed Applicator:** Robert Jateff
7. **Lake Description:** **Surface Acres:** 18. **Volume:** 252 Acre Feet:
Maximum Depth: 26. **Average Depth:** 14
8. **Stream Description:** **Width:** N/A, **Length:** N/A
Flow Rate of Stream/Outlet (cu. ft. per sec.): N/A
9. **Name of Fish Toxicant Product Used:** CFT Legumine Liquid
10. **Description of Treatment Method:** Liquid applied via air by helicopter and on ground by backpack sprayer, and a drip can placed in spring at marsh area in upper lake.
11. **Quantity of Fish Toxicant used:** 84 gallons
12. **Concentration of rotenone in formulated Rotenone product:** 5%
13. **Concentration of active rotenone in water:** 1.0 ppm product; 50 ppb a.i.

14. Water conditions/quality: Water sampling done within 24hrs pre-treatment:

Depth (m)	Temperature °C	pH	DO (ppm)
0.7	11.80	8.50	6.85
1.7	11.27	8.50	6.66
2.6	11.11	8.48	6.56
3.6	11.07	8.49	6.59
4.6	11.05	8.49	6.41
5.5	11.02	8.48	6.38
6.9	10.90	8.49	6.41

- 15. Detoxification of rotenone treated water (if required):** Description of detoxification methods/equipment; potassium permanganate application rate (pounds per hour); flow rate of stream/outlet (cu. ft. per sec.); estimate of average concentration (ppm): N/A
- 16. Description of lake inlets(s)/outlet(s) and any temporary water control measures (if required):** N/A
- 17. Period of Toxicity:** 4-6weeks
- 18. Eradicated fish species:** bluegill sunfish and rainbow trout
- 19. Results of pre and post treatment monitoring:** Prior to the treatment, the lake was sampled for various parameters including temperature, pH, and zooplankton. Post sampling included VOC and Semi-VOC within 24 hours of treatment. Taking of the samples required for the "four weeks post-treatment" were delayed until December 3, 2008 due to weather and road conditions. No VOC, semi-VOC, or N-methylpyrrolidone components were detected in either sampling period.
- 20. Impact on non-target organisms:** None observed
- 21. Brief description of treatment/detoxification and other comments:** The treatment began at 1100 on Oct 23, 2008 and was completed at 1200 on the same day based on a concentration of 1ppm. The two lakes were aerial sprayed by helicopter and took less than an hour to complete. Spot spraying by backpack sprayer was also done in areas that the helicopter could not reach. A drip can was placed in the spring area on the upper lake for one hour. Fish started to stress almost immediately as hundreds of juvenile bluegill surfaced in both lakes. All age classes of fish were evident from ½ inch up to 7-inch adults. No more than a dozen age 2+ rainbow trout were noted in either lake all of which were in the 12-13 inch class. By the next day there were thousands of young-of-the-year bluegills in both the upper and lower lake. No fish were observed still alive, which indicated a good efficacy on the treatment. A bioassay was conducted 4 weeks post treatment with all fish surviving. During December 2008, cutthroat trout fingerlings were restocked in each lake to assess post-rehabilitation overwinter survival.

ESN NORTHWEST CHEMISTRY LABORATORY

Washington Dept. of Fish & Wildlife
STARZMAN LAKES REHABILITATION PROJECT
Client Project #10-08
Brewster, Washington

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 (360) 459-3432 Fax
lab@esnnw.com

Analytical Results

8260, µg/L (Water)	Reporting	MTH BLK	LCS	Starzman	MS	MSD	RPD
Date analyzed	Limits				10/15/08	10/15/08	
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
1,1-Dichloroethene	1.0	nd	179%	nd	141%	91%	43%
Methylene chloride	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	116%	nd	116%	105%	10%
Trichloroethene	1.0	nd	131%	nd	120%	113%	6.0%
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	100%	nd	92%	85%	7.9%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene	1.0	nd		nd			
1,2-Dibromoethane (EDB)	1.0	nd		nd			
Chlorobenzene	1.0	nd	113%	nd	107%	98%	8.8%
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	3.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			
Surrogate recoveries							
Dibromofluoromethane		120%	118%	124%	109%	98%	
Toluene-d8		93%	96%	93%	93%	92%	
4-Bromofluorobenzene		99%	104%	97%	111%	104%	

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S81030.1
Client: WDFW
Client Job Name: Starzman Lakes Rehab

Analytical Results

8270, µg/L	MTH BLK		LCS	Starzman Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	11/03/08	11/03/08	10/31/08	11/03/08	11/03/08	
Date analyzed	Limits	11/03/08	11/03/08	11/03/08	11/03/08	11/03/08	
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	87%	91%	4%
2-Chlorophenol	2.0	nd		nd	107%	113%	5%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	119%	nd	102%	102%	0%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexachlorethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	116%	115%	1%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd			
2,4-Dimethylphenol	2.0	nd		nd	89%	94%	5%
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	119%	119%	0%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	119%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	68%	72%	6%
2-Methylnapthalene	2.0	nd		nd			
1-Methylnapthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinitrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	111%	nd	96%	98%	2%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd	84%	86%	2%
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S81030.1
Client: WDFW
Client Job Name: Starzman Lakes Rehab

Analytical Results

8270, µg/L	MTH BLK		LCS	Starzman Lake	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	11/03/08	11/03/08	10/31/08	11/03/08	11/03/08	
Date analyzed	Limits	11/03/08	11/03/08	11/03/08	11/03/08	11/03/08	
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	133%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	120%	nd	75%	76%	1%
Pyrene	0.2	nd		nd			
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	73%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	71%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

Surrogate recoveries

2-Fluorophenol	91%	108%	121%	86%	86%
Phenol-d6	101%	114%	130%	92%	91%
Nitrobenzene-d5	109%	131%	113%	90%	88%
2-Fluorobiphenyl	87%	131%	93%	86%	84%
2,4,6-Tribromophenol	41%	44%	80%	47%	49%
4-Terphenyl-d14	72%	119%	63%	70%	68%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %

Phenol - d5: 10-135 %

2,4,6- tribromophenol: 29-159%

Nitrobenzene - d5: 20-120 %

2-Fluorobiphenyl: 50-150%

p-Terphenyl-d14: 50-150%

Acceptable RPD limit: 35%

ESN NORTHWEST CHEMISTRY LABORATORY

Washington State Fish & Wildlife
STARZMAN LAKES REHABILITATION PROJECT
Brewster, Washington

Analytical Results

8260, µg/L (Water)	Reporting	MTH BLK	LCS	MW-1	MS	MSD	RPD
Date analyzed	Limits	12/08/08	12/08/08	12/08/08	12/08/08	12/08/08	12/08/08
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	0.2	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
Acetone	10.0	nd		nd			
1,1-Dichloroethene	1.0	nd		nd			
Methylene chloride	1.0	nd		nd			
Methyl-t-butyl ether (MTBE)	1.0	nd	93%	nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
2-Butanone (MEK)	10.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane (EDC)	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	113%	nd	115%	112%	3%
Trichloroethene (TCE)	1.0	nd	139%	nd			
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
4-Methyl-2-pentanone (MIBK)	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	106%	nd	100%	100%	1%
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
2-Hexanone	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene (PCE)	1.0	nd	129%	nd			
1,2-Dibromoethane (EDB)	1.0	nd	109%	nd			
Chlorobenzene	1.0	nd		nd			
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd	109%	nd	100%	96%	4%
Xylenes	3.0	nd	101%	nd	100%	93%	7%
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			
Surrogate recoveries							
Toluene-d8		107%	116%	108%	109%	115%	
4-Bromofluorobenzene		129%	123%	126%	123%	125%	

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S81208.2
Client: WDFW
Client Job Name: Starzman Lakes

Analytical Results

8270, µg/L	MTH BLK		LCS	Starzman Lakes	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/10/08	12/10/08	12/10/08	12/10/08	12/10/08	
Date analyzed	Limits	12/10/08	12/10/08	12/10/08	12/10/08	12/10/08	
Pyridine	2.0	nd		nd			
Aniline	2.0	nd		nd			
Phenol	2.0	nd		nd	92%	93%	1%
2-Chlorophenol	2.0	nd		nd	111%	114%	3%
Bis (2-chloroethyl) ether	2.0	nd		nd			
1,3-Dichlorobenzene	2.0	nd		nd			
1,4-Dichlorobenzene	2.0	nd	116%	nd	103%	101%	2%
1,2-Dichlorobenzene	2.0	nd		nd			
N-methylpyrrolidone	2.0	nd		nd			
Benzyl alcohol	2.0	nd		nd			
2-Methylphenol (o-cresol)	2.0	nd		nd			
Bis (2-chloroisopropyl) ether	10.0	nd		nd			
3,4-Methylphenol (m,p-cresol)	2.0	nd		nd			
Hexachlorethane	2.0	nd		nd			
N-Nitroso-di-n-propylamine	2.0	nd		nd	128%	124%	3%
Nitrobenzene	2.0	nd		nd			
Isophorone	2.0	nd		nd			
2-Nitrophenol	10.0	nd		nd			
4-Nitrophenol	10.0	nd		nd			
2,4-Dimethylphenol	2.0	nd		nd	105%	107%	2%
Bis (2-chloroethoxy) methane	2.0	nd		nd			
2,4-Dichlorophenol	10.0	nd		nd			
1,2,4-Trichlorobenzene	2.0	nd		nd	120%	114%	5%
Naphthalene	2.0	nd		nd			
4-Chloroaniline	10.0	nd		nd			
Hexachlorobutadiene	2.0	nd	126%	nd			
4-Chloro-3-methylphenol	10.0	nd		nd	79%	83%	5%
2-Methylnaphthalene	2.0	nd		nd			
1-Methylnaphthalene	2.0	nd		nd			
Hexachlorocyclopentadiene	2.0	nd		nd			
2,4,6-Trichlorophenol	10.0	nd		nd			
2,4,5-Trichlorophenol	10.0	nd		nd			
2-Chloronaphthalene	2.0	nd		nd			
2-Nitroaniline	10.0	nd		nd			
1,4-Dinitrobenzene	10.0	nd		nd			
Dimethylphthalate	2.0	nd		nd			
Acenaphthylene	0.2	nd		nd			
1,3-Dinitrobenzene	10.0	nd		nd			
2,6-Dinitrotoluene	2.0	nd		nd			
1,2-Dinitrobenzene	2.0	nd		nd			
Acenaphthene	0.2	nd	131%	nd	99%	96%	3%
3-Nitroaniline	10.0	nd		nd			
Dibenzofuran	2.0	nd		nd			
2,4-Dinitrotoluene	2.0	nd		nd	88%	89%	1%
2,3,4,6-Tetrachlorophenol	2.0	nd		nd			
2,3,5,6-Tetrachlorophenol	2.0	nd		nd			
2,4-Dinitrophenol	10.0	nd		nd			
Fluorene	0.2	nd		nd			

ESN NW BELLEVUE CHEMISTRY LABORATORY
Tel:(425) 957-9872, Fax: (425) 957-9904

ESN Job Number: S81208.2
Client: WDFW
Client Job Name: Starzman Lakes

Analytical Results

8270, µg/L	MTH BLK		LCS	Starzman Lakes	MS	MSD	RPD
Matrix	Water	Water	Water	Water	Water	Water	
Date extracted	Reporting	12/10/08	12/10/08	12/10/08	12/10/08	12/10/08	
Date analyzed	Limits	12/10/08	12/10/08	12/10/08	12/10/08	12/10/08	
4-Chlorophenylphenylether	2.0	nd		nd			
Diethylphthalate	2.0	nd		nd			
4-Nitroaniline	10.0	nd		nd			
4,6-Dinitro-2-methylphenol	10.0	nd		nd			
N-nitrosodiphenylamine	2.0	nd	125%	nd			
Azobenzene	2.0	nd		nd			
4-Bromophenylphenylether	2.0	nd		nd			
Hexachlorobenzene	2.0	nd		nd			
Pentachlorophenol	10.0	nd		nd			
Phenanthrene	0.2	nd		nd			
Anthracene	0.2	nd		nd			
Carbazole	2.0	nd		nd			
Di-n-butylphthalate	2.0	nd		nd			
Fluoranthene	0.2	nd	114%	nd			
Pyrene	0.2	nd		nd	90%	95%	5%
Butylbenzylphthalate	2.0	nd		nd			
Bis(2-ethylhexyl) adipate	2.0	nd		nd			
Benzo(a)anthracene	0.2	nd		nd			
Chrysene	0.2	nd		nd			
Bis (2-ethylhexyl) phthalate	2.0	nd		nd			
Di-n-octyl phthalate	2.0	nd	86%	nd			
Benzo(b)fluoranthene	0.2	nd		nd			
Benzo(k)fluoranthene	0.2	nd		nd			
Benzo(a)pyrene	0.2	nd	96%	nd			
Dibenzo(a,h)anthracene	0.2	nd		nd			
Benzo(ghi)perylene	0.2	nd		nd			
Indeno(1,2,3-cd)pyrene	0.2	nd		nd			

Surrogate recoveries

2-Fluorophenol	93%	114%	90%	91%	91%
Phenol-d6	94%	122%	96%	99%	94%
Nitrobenzene-d5	111%	118%	117%	95%	89%
2-Fluorobiphenyl	87%	130%	89%	84%	83%
2,4,6-Tribromophenol	65%	104%	129%	87%	83%
4-Terphenyl-d14	91%	96%	82%	80%	81%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits:

2-Fluorophenol: 10-135 %

Phenol - d5: 10-135 %

2,4,6- tribromophenol: 29-159%

Nitrobenzene - d5: 20-120 %

2-Fluorobiphenyl: 50-150%

p-Terphenyl-d14: 50-150%

Acceptable RPD limit: 35%